

# Construction Growth in Essex 2020-2040

Essex County Council

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Essex County Council

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## Executive Summary

This commission defines the challenges that the Essex construction industry is likely to face over the next 20 years and recommends measures that can be taken to maximise the opportunities created in a sustainable manner.

### Local Context

Essex has a large and mature construction sector, generating £4.7bn per annum in Gross Value Added (GVA) and making a net contribution to wider regional growth beyond its boundaries. The anticipated pipeline of construction activity expected to during the next 20 years is significant and takes place against a backdrop of significant political, economic and technological change.

Baseline data indicates that the size of the resident construction workforce has consistently tracked above the number of jobs available locally by between c.5,000 and c.19,000. This is reflective of the role Essex plays in supplying labour to support growth in neighbouring areas – particularly Greater London. In total, around 80,000 Essex residents are employed in the construction industry, with around 67,000 jobs available locally.

The county is dominated by small/micro enterprises and the self-employed with strengths in Skilled Trades. By contrast, Essex has a relatively small Civil Engineering sector (a key demand of many of the emerging major projects) and has relatively few jobs in office-based technical roles (such as Architects, Engineers and Quantity Surveyors). Over time, the demand for non-manual roles, including office-based professional and technical roles, is expected to increase, whilst demand for traditional skilled trades will decline, as a result of changing practices, technologies and workforce demographics.

Provision of traditional construction skills training and education in the county is well established, with local FE colleges delivering the bulk of traditional taught courses as well as supporting apprenticeships and competence assessment for some traditional trades. FE colleges are also developing new training and qualifications in response to employer needs to meet the demands of emerging sector innovation, particularly supporting manufacturing and assembly methods.

Private training providers operate in the county and nationally to support assessment and training for traditional and specialist occupations on a demand-driven basis. This is complemented by the Essex Construction Training Association (ECTA) and the Construction Industry Training Board; and Higher level qualification are delivered through FE and HE institutions; the inclusion of digital technology is available and supported in these programmes.

Other notable delivery is supported through an established regional shared apprenticeship scheme for construction trades and occupations as well as the South East Construction Training Academies (SECTA), both state that they support craft and operative; and supervisory and management and professional pathways. SECTA's focus has become established as a 'Social Value enterprise', targeting those having difficulty accessing work and needing employability support.

### Growth Agenda and Major Projects Pipeline

A significant pipeline of major projects has been identified, including six new Garden Communities, a significant programme of highways improvements, other transport enhancements, a major new facility for Public Health England at Harlow, and expansion at Stansted Airport among others. This is in addition to the county's two megaprojects – Lower Thames Crossing (which will also impact on Kent), and Bradwell B nuclear new build. In total, the identified projects would deliver around 35,000 new homes by 2040 alongside infrastructure with a value of around £26bn.

Outside of the Essex boundary, other megaprojects are also expected to draw on the Essex workforce. These include High Speed 2, Silvertown Tunnel and potential Heathrow Airport Expansion in London; Sizewell C nuclear new build and East Anglia windfarms in Suffolk; and the London Resort in Kent.

The South East Local Enterprise Partnership (SELEP) highlights the need to boost productivity in the region, and identifies skills development, aligned closely to the needs of employers, as being key to achieving this in the context of growth and technological change.

### **Supply and Demand Assessment**

Strong baseline demand growth in the Essex construction sector is forecast; according to the East of England Forecasting Model (EEFM), average growth of 1.4% per annum is expected between 2020 and 2040, meaning that, even before additional demand from major projects is taken into account, the resident construction workforce will need to grow by an estimated 750 workers per annum to meet demand.

When combined, the major projects identified are expected to add 15,000 to labour demand at peak in 2031, creating an overall level of demand in this year of c.101,000 (including out-commuters meeting demand elsewhere). As the pipeline of projects is stronger in the first 10-12 years, demand recedes slightly by 2040 to c.97,000.

The baseline labour supply forecast, based on the growth rate of the Essex working age population from the EEFM, is less strong, with the pool of available labour expected to grow by an average of 0.3% per annum 2020-2040 (from 79,292 to 83,068). As such, the supply of labour (without intervention) will fail to keep pace with demand. It is estimated that the shortfall of labour supply in the peak demand year (2031) will be around 12,900.

At the occupation level, the greatest shortages are expected to be in Non-Construction Professional roles, Wood Trades and Labourers. Peaks in demand also result in significant temporary shortages of Plumbing and HVAC Trades, Electrical Trades, Plant Operatives and Civil Engineering Operatives.

### **Key Issues and Disruptors in the Construction Industry**

The analysis described above assumes a continuation of existing industry practices. However, the sector is experiencing accelerated change and emerging methods are expected to impact supply and demand. Innovation is becoming more mainstream against the historic background of being mainly focused on housebuilding. This is driven by the need to address sector skills decay; increase productivity, quality and health and safety; improve environmental outcomes and embed technology supporting Building Information Modelling (BIM).

For the housing sector Modern Methods of Construction is focused on two main methodologies – volumetric and panelised. However, variation in design and development impact the levels of on-site and off-site requirements; developments can be hybridised to accommodate traditional, volumetric, panelised and other systems-based delivery.

Barriers to off-site production include the need to change behaviours relating to product quality and to understand skills requirements; investment risk associated with growing manufacturing capacity and insufficient security relating to future developments.

MMC has the potential to transform the sector, however, growing adoption of MMC is not predicted to impact the labour deficit in any substantial way in the short to medium term – particularly when combined with the impacts of Brexit and emerging Migration Policy, the demands of national infrastructure investment and county specific major projects.

### Opportunities, Challenges and Recommendations

The report looks at the nature of change in the sector and the role it has in driving increased productivity. Key to achieving this is leadership to create a strategic vision for the sector. The significant infrastructure projects planned over the next 20 years bring together a number of key stakeholders in Essex that have a joint objective of improved efficiency and shared workforce needs.

A construction innovation network led by the local authority, key primes and developers would set strategic objectives to support the sector in Essex across: Supply Chain Development and Innovation; Skills; and lobbying for support from government and other stakeholders. Such a network would build on a set of core principles around: leadership; communication; collaboration and coordination; and capability.

This approach could support the development of a range of complementary initiatives to support collaboration across different tiers of the supply chain and the implementation of innovations through:

- Development of a Construction Supply Chain School.
- Promotion of innovation through collaborative procurement models.
- Development of an MMC cluster.

In addition to the long-established issues relating to skills decay and promoting construction to entry level candidates the report defines the key skills challenges within the following context:

- FE taught skills do not address the skills decay of fully competent workers.
- Traditional definitions aligned to Standard Industrial Classification of economic activities (SIC) and UK Standard Occupational Classification (SOC) codes are embedded within the sector structures and sector skills standards for qualification and training; these do not sufficiently accommodate emerging skills needs related to cross sector interdependencies, specifically relating to innovation in manufacture and assembly systems.

The report identifies examples of innovation in education and training in Essex and confirms that 'early adoption' should be stimulated to accelerate the use of technology in training, to promote the sector to young people and to encourage lifelong learning.

The report looks to Major Projects in Essex that will support progress towards this through section 106 and social value commitments. It also seeks to establish opportunity related to projects outside of the county but have direct impact such as Sizewell C and concludes:

- Opportunity should focus on:
  - developing capabilities at level 2 and above in construction occupations;
  - build legacy and capability in the county beyond the lifetime of the project;
  - offer a long-term focus on transferable skills, fabrication and assembly, manufacturing and engineering supply-chains.
- Predicted scale of construction activity in Essex provides the opportunity to maximise collaboration to influence change – developers, major project main contractors and Tier One contractors provides the opportunity for strategic leadership supporting local supply chains.

- Development of the conditions to encourage MMC will drive the pace of change through collaborative procurement models and the potential to develop business clusters coupled with support to develop supply chain stakeholders.
- In response the county should look to further develop the capability with FE colleges and training providers through interventions that enable knowledge transfer and support collaborative resourcing. This could also be enabled through submission for Institute of Technology and the development of a supply-school linked to innovative enterprise for emerging and modern methods.
- In responding to these challenges and opportunities it recommends that Essex County Council should seek to lead collaborative engagement to influence reform in the current structures; to develop 'fast-track' routes to competence through collaborative authority; to mandate and expand the use of shared apprenticeship schemes and to champion the development of a not-for-profit Essex Jobs Brokerage.
- A route to delivery could be offered through the formation of an Essex Skills and Supply Chain Alliance, that offers 'one-stop' brokerage into aligned delivery.

Finally, it is necessary to understand the issues facing the sector and broader economy with regards to Covid-19. The current public health response to the pandemic will have a lasting impact; this has the potential to significantly change the challenges in the short-to-medium term. However, it is likely it will also accelerate change as the sector seeks to recover and supply chains respond to future demands.

## 1. Introduction

Essex County Council (ECC) has commissioned Mace to identify the potential labour market and skills implications of a predicted boost in construction activity in Essex and surrounding areas over the next 20 years.

Essex has a mature construction industry that has supported economic growth both within the county and across the wider region over a sustained period of time. The current pipeline of activity, including several multi-billion pound megaprojects, is considered to be unprecedented in recent decades. This commission explores how these major projects may impact the construction workforce over the next 20 years and identifies key steps that could be taken by ECC to secure a sustainable legacy from this unprecedented period of construction activity.

ECC has outlined challenges for this commission to respond to:

- To provide a comprehensive understanding of the current and future construction pipeline in terms of workforce demands – both in aggregate terms and by occupation;
- To identify how changing political and economic circumstances and industry practices could impact on the supply of or demand for construction labour over this period; and
- To explore opportunities for intervention by ECC to secure a positive, sustainable legacy from the pipeline of construction activity.

To achieve this, comprehensive research and analysis has been carried out to quantify the likely scale of labour demand associated with the identified pipeline of major projects. This is then cross-referenced against the likely future supply of construction labour to identify any potential deficits or surpluses over the course of the assessment period. The likely breakdown of this demand by occupation is also identified, based on desktop research and, where project-specific forecasts are not yet available, professional experience and insights gained from similar projects.

A review of literature around key issues and disruptors within the construction industry is also provided, alongside a series of sensitivity tests of the supply and demand modelling to predict the potential impact of a range of transformative issues – including moves towards more productive methods of construction delivery, and the implications of changing government policy around migration and infrastructure investment.

Finally, the evidence gathered through the processes described above is used to define the key opportunities and challenges that Essex is likely to face over the course of the study period. A series of recommendations are presented, describing practical measures that can be taken to maximise the opportunity and minimise the risk associated with the emerging pipeline of construction activity.

### 1.1 Assumptions and Limitations

It is important to note that many aspects of this commission are based on significant assumptions – particularly around project delivery timescales (which inevitably change as projects encounter unexpected complexities and plans mature). It is possible that some projects will be delayed or cancelled, whilst other projects may emerge. This commission assumes that all projects that are sufficiently advanced (i.e. have secured funding or have significant political backing) at the time of writing will proceed to their announced timescales and budgets, to provide a ‘central’ estimate of future supply and demand. As such, the estimates of supply and demand are model-based and intended to provide an indication of potential scale and composition of demand, rather than a definitive statement

of the requirements associated with each project. Engagement with major project developers will need to continue as requirements are refined.

### **1.2 Potential Impact of Covid-19**

The current Coronavirus pandemic is firstly a public health crisis, but the effective shutdown of large parts of the economy in response will have both short and long-term consequences. At this stage (Mid-April 2020) it is too early to assess the extent of the outbreak and the implications for the economy. Forecasts of the impact vary from a contraction of around 8% to well over 15% depending on the length of the health emergency and the success of the economic stimulus and mitigation measures that are put in place.

What is clear is that the longer that measures are in place that limit economic and industrial activity, the greater the consequences will be. In the first weeks of the crisis, new claims for universal credit reached just short of one million. The structure of the construction sector potentially exacerbates risk; with the high proportion of SMEs and the number of self-employed contractors in the sector, the crisis may lead to significant unemployment and business failure in the sector. Another factor, in a globalised economy, is the speed at which supply chains can be re-established and mobilised to respond to demand.

For this commission, it has been assumed that all pipeline projects will proceed as indicated prior to the current crisis. We have noted, however, where any assumptions made could be materially changed by the potential outcomes of the crisis and made a qualitative judgement about what the implications might be. The findings of this commission should therefore be considered in this context.

Our recommendations are, for the most part, focussed on the long-term productivity of the Essex construction sector against a backdrop of labour shortages, which we believe hold true. However, we have also considered the need for short-term responses to mitigate the economic shock of the current crisis. The necessary short-term interventions will support a return to work, and in some cases have the potential to act as the catalyst for the development of mechanisms to deliver longer-term solutions.



## 2. Local Context

This chapter reviews key baseline data on the construction sector in Essex, the workforce it draws upon, and explores the training provider landscape that develops this workforce. The purpose of this is to evidence the key inputs into the quantitative assessment of labour supply and demand, as well as identify structural issues around workforce and skills which in turn inform the qualitative aspects of this commission.

It is important to note that this analysis is based on the most recently-published estimates from ONS and other data sources. Given that ONS statistics are historic, however, they do not yet reflect the significant impact on the UK economy that is beginning to emerge due to Covid-19.

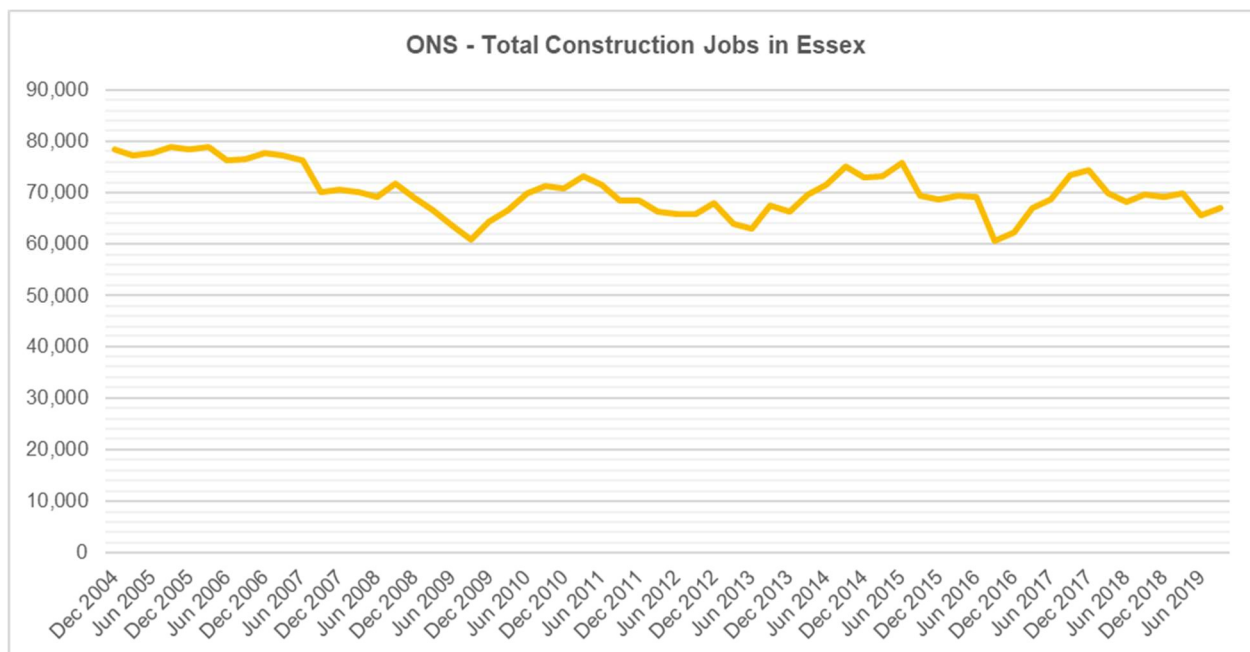
First, the construction industry in Essex is profiled, identifying its scale, demographic characteristics and areas of specialism. Next, the resident construction workforce is profiled, again identifying its scale and key characteristics relative to baseline demand. The provision of construction training is then surveyed, identifying how the local skills infrastructure relates to the supply of, and demand for, construction skills in 2020.

### 2.1 Construction Industry Profile

Essex has a large and mature construction industry, contributing £4.7bn in Gross Value Added to the UK economy in 2018 and accounting for 9% of total jobs in the county.<sup>1</sup> As shown in Figure 2.1, the overall size of the construction industry (in terms of jobs) has remained relatively static since the current time series began in 2004, fluctuating over time between a low point of c. 60,000 and a high point of c. 80,000 jobs. The lowest points were observed during at the onset of the late 2000s recession and in the immediate aftermath of the Brexit referendum in 2016, and the highest points were observed at the beginning of the time series.

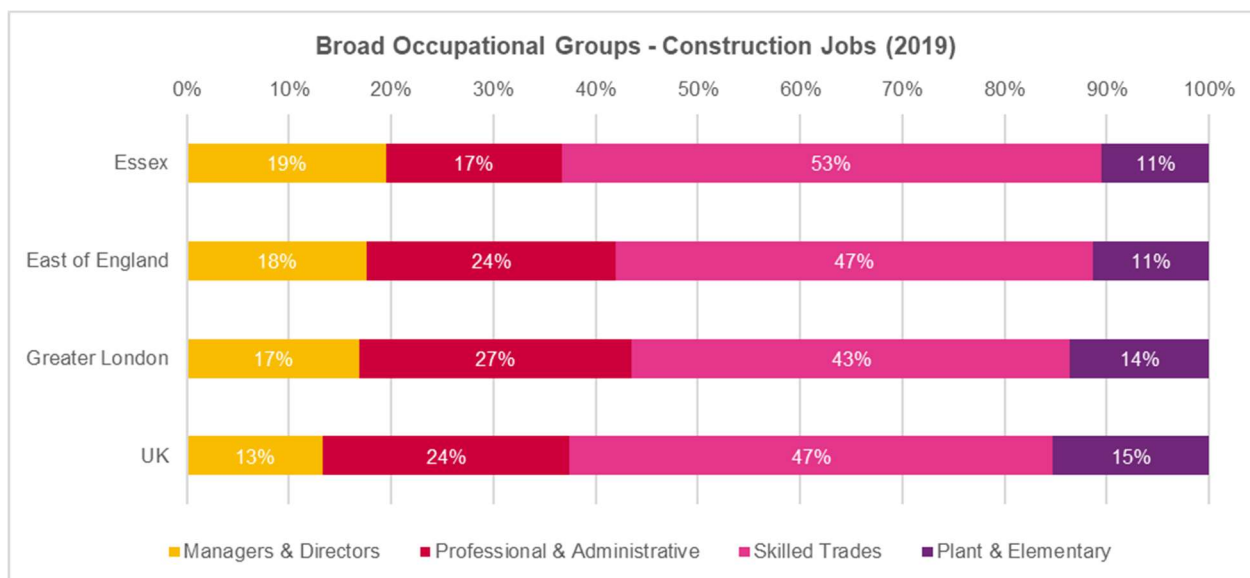
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<sup>1</sup> ONS, Regional GVA

**Figure 2.1: Time Series of Construction Jobs in Essex – 2004-2019**

Source: ONS, Annual Population Survey

According to ONS data summarised in Figure 2.2, 53% of construction jobs in Essex are classified as 'Skilled Trades' – a significantly higher proportion than regional and national average. By contrast, Greater London has a much lower proportion of Skilled Trades than Essex but a much higher proportion of Professional and Administrative roles. Essex's high proportion of Managers and Directors may, at least in part, be explained by the high proportion of self-employed small business owners, who classify as 'company director' rather than their hands-on construction role.

**Figure 2.2: Construction Jobs by Broad Occupational Group**

Source: ONS, Annual Population Survey; Excludes the very small number of jobs in

Self-employment accounts for a large proportion of Essex construction jobs (55%) compared with regional (48%) and national average (41%).<sup>2</sup> Data on the size of Essex's construction businesses also provides insight into the structure of the construction economy in the county. As demonstrated in Table 2.1, the vast majority of construction businesses in Essex are 'Micro' (less than 10 staff) or 'Small' (10

<sup>2</sup> ONS, Annual Population Survey

to 49 staff). Essex accounts for 35% of the East of England region's Micro construction businesses, but just 22% of the region's 'Large' (250+ staff) businesses, further demonstrating the prevalence of small-scale enterprises within the county.

**Table 2.1: Construction Businesses (Local Units) by Employee Size Band, 2018**

	Micro (0 to 9)	Small (10 to 49)	Medium- sized (50 to 249)	Large (250+)	Total
<b>Essex Businesses</b>	16,800	695	90	10	17,595
<b>East of England Businesses</b>	47,770	2,190	290	45	50,295
<b>Essex % of Regional Businesses</b>	35%	32%	31%	22%	35%

Source: ONS, UK Business Counts

Table 2.2 overleaf provides further detail on Essex's share of regional construction businesses and employees by detailed industrial class, again based on ONS data. Including related professions such as Architecture and Quantity surveying, Essex accounts for 35% of the region's construction businesses, and 31% of the region's construction employees and working owners (excluding businesses which are not registered for PAYE with HM Revenue and Customs – usually smaller scale sole traders). On this basis, Essex accounts for relatively high proportions of the region's 'Specialised Construction Activities' businesses and employment, but relatively low proportions within 'Civil Engineering'. There are particularly low concentrations of workers employed by 'Road and Motorway construction', 'Other Civil Engineering Projects' and 'Electricity and Telecoms Projects' employers – all of which are expected to be in high demand as a result of the major project pipeline in the county.

**Table 2.2: Concentrations of Regional Construction Businesses and Employees\* in Essex, 2018**

Construction Industry Classes/Sub-Classes	East of England Businesses	Essex Businesses	Essex % of Regional Businesses	East of England Employees	Essex Employees	Essex % of Regional Employees
<b>Construction of Buildings</b>						
Development of building projects	3,995	1,195	30%	9,000	3,000	33%
Construction of residential and non-residential buildings	7,080	2,395	34%	41,000	12,000	29%
<b>Subtotal</b>	<b>11,075</b>	<b>3,590</b>	<b>32%</b>	<b>50,000</b>	<b>15,000</b>	<b>30%</b>
<b>Civil Engineering</b>						
Construction of roads and motorways	445	150	34%	5,000	1,250	25%
Construction of railways and underground railways	255	145	57%	700	400	57%
Construction of bridges and tunnels	-	-	-	-	-	-
Construction of utility projects for fluids	55	25	45%	600	-	-
Construction of utility projects for electricity and telecoms	80	25	31%	1,500	150	10%
Construction of water projects	40	15	38%	125	-	-
Construction of other civil engineering projects n.e.c.	1,920	625	33%	13,000	3,000	23%
<b>Subtotal</b>	<b>2,095</b>	<b>690</b>	<b>33%</b>	<b>20,925</b>	<b>4,800</b>	<b>23%</b>
<b>Specialised Construction Activities</b>						
Demolition	120	40	33%	900	500	56%
Site preparation	350	130	37%	1,500	600	40%
Test drilling and boring	35	-	-	225	-	-
Electrical installation	5,690	2,095	37%	20,000	7,000	35%
Plumbing, heat and air-conditioning installation	4,990	1,725	35%	16,000	5,000	31%
Other construction installation	1,080	465	43%	4,500	2,000	44%
Plastering	695	260	37%	1,250	400	32%
Joinery installation	3,120	1,140	37%	6,000	2,000	33%
Floor and wall covering	1,130	470	42%	2,000	900	45%
Painting and glazing	1,890	635	34%	4,000	1,000	25%
Other building completion and finishing	3,295	1,315	40%	10,000	2,500	25%
Roofing activities	1,130	450	40%	3,000	1,000	33%
Other specialised construction activities n.e.c.	3,140	1,280	41%	13,000	5,000	38%
<b>Subtotal</b>	<b>26,665</b>	<b>10,005</b>	<b>38%</b>	<b>82,375</b>	<b>27,900</b>	<b>34%</b>
<b>Related Technical Professions</b>						
Architectural activities	1,525	475	31%	7,000	1,750	25%
Engineering activities and related technical consultancy	7,450	2,285	31%	42,000	13,000	31%
Quantity surveying activities	785	240	31%	3,000	900	30%
<b>Subtotal</b>	<b>9,760</b>	<b>3,000</b>	<b>31%</b>	<b>52,000</b>	<b>15,650</b>	<b>30%</b>
<b>Total Construction and Related Professions</b>	<b>49,595</b>	<b>17,285</b>	<b>35%</b>	<b>205,300</b>	<b>63,350</b>	<b>31%</b>

Source: ONS, UK Business Counts and Business Register Employment Survey; \*Includes employees and working owners registered for PAYE only, and therefore excludes some self-employed and employees of smaller businesses. – indicates less than 10 businesses or less than 50 employees, excluded from analysis. Red = Below average concentration, Green = Above average concentration

In summary, the Essex construction industry, though large and well-established, is skewed towards small enterprises with a focus on specialised activities and skilled trades. Essex has relatively low proportions of professional and administrative jobs, particularly when compared with Greater London, and has a relatively small Civil Engineering sector – particularly within the road construction and utilities sectors.

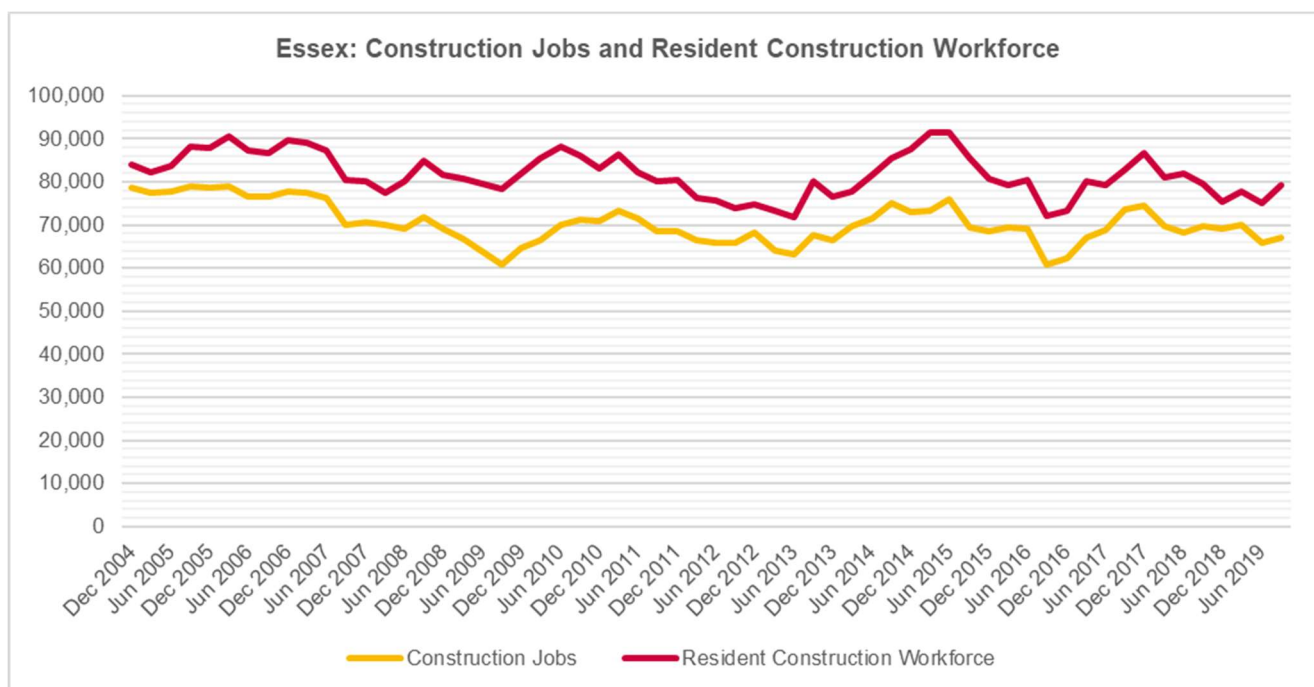
## 2.2 Essex Workforce Profile

Essex has a large resident workforce, with 895,000 residents of working age and an economic activity rate of 80.3% (higher than the national average of 78.7%) as of September 2019. Unemployment (again as of September 2019) is estimated at 2.7% - significantly lower than national average (3.9%) and slightly lower than regional average (3.0%). This is the lowest unemployment rate for Essex reported by the ONS Annual Population Survey since the current time series began in 2004. Though Covid-19 will inevitably influence unemployment rates across the country (and indeed the world), this data highlights Essex's high levels of employment (at county level) relative to other parts of the UK, meaning that the impact of rising unemployment may be less severe than in more deprived areas with fundamentally weaker economies.

### Workforce Scale and Spatial Dynamics

As described in Section 2.1, the Essex construction industry is large and well established, with sectoral strengths in Specialised Construction Activities/Skilled Trades in particular. The resident workforce employed in construction is similarly large and well-established; as demonstrated in Figure 2.3 below, the resident construction workforce has consistently tracked above the number of construction jobs since the current time series began in 2004.

**Figure 2.3: Construction Jobs and Resident Construction Workforce in Essex 2004-2019**



Source: ONS, Annual Population Survey

The gap between the number of jobs and size of resident construction workforce represents net commuting activity. In this case, with a larger workforce than the number of jobs available within Essex, there is a net out-flow of commuters to surrounding areas (and potentially further afield).

Table 2.3 below summarises the net resident labour supply for Essex compared against neighbouring areas and regional and national average.

**Table 2.3: 5-year trend – Average Construction Jobs and Resident Construction Workforce**

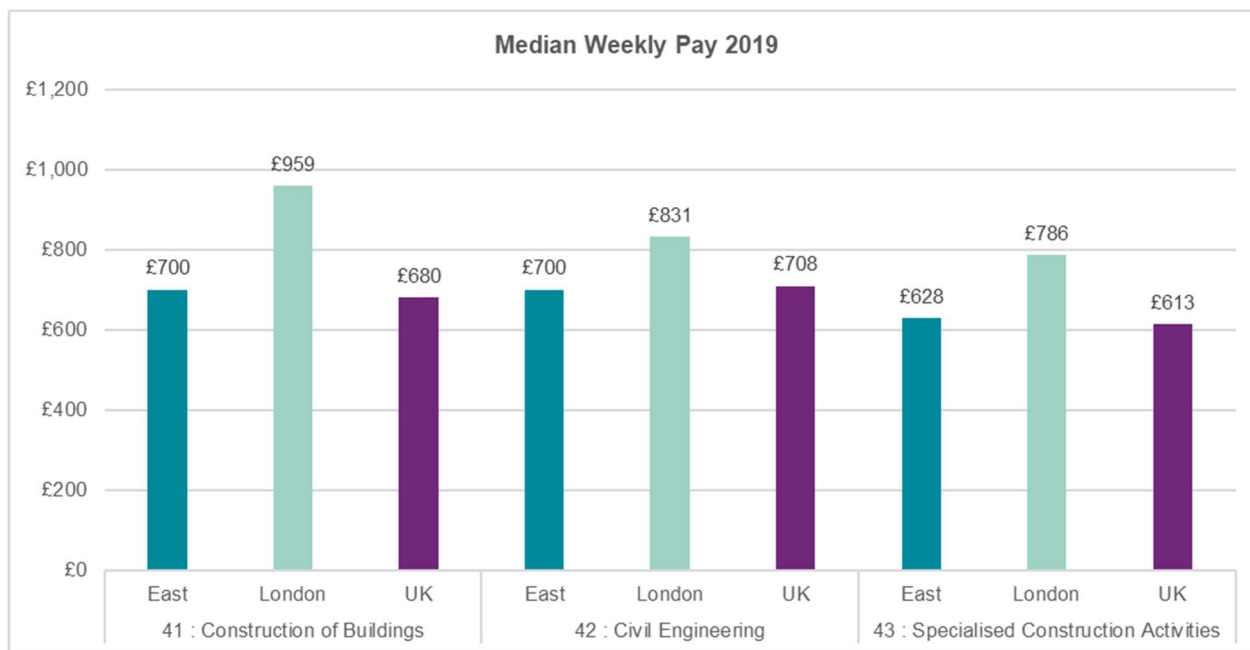
	Construction Jobs	Resident Construction Workforce	Net Resident Labour Supply
East of England	213,065	238,295	25,230
<b>Greater Essex</b>	<b>69,245</b>	<b>80,995</b>	<b>11,750</b>
Kent	72,185	82,430	10,245
Suffolk	25,820	27,230	1,410
Hertfordshire	39,840	47,315	7,475
Cambridgeshire	27,665	25,885	-1,780
Greater London	354,150	308,795	-45,355

Source: ONS, Annual Population Survey

Over the last five years, the net resident labour supply (resident workforce minus local construction jobs) in Essex has averaged +11,750, compared against an average net supply of -45,355 for Greater London (indicating a net in-flow of workers commuting to the capital). Like Essex, Kent and Hertfordshire also show significant surpluses of resident construction labour, which adds weight to the assumption that Greater London attracts significant volumes of construction labour from the home counties. Over time, the net resident labour supply for Essex has ranged from a low of 4,900 to a high of 18,900, indicating a degree of flexibility to meet demand within Essex and across the wider region.

Although on a net basis Essex is an exporter of construction labour, research commissioned by the Construction Industry Training Board (CITB) on workforce mobility in construction indicates that around 40% of survey respondents working on sites in the East of England region (which Essex forms part of) had travelled in from other regions – primarily London (16%), South East (11%) and the East Midlands. Similarly, 37% of workers surveyed on sites in London had travelled in from other regions, with the East of England contributing the greatest share (18%). This suggests that Essex forms part of a geographically wider construction labour market, and that demand on Essex's labour supply is influenced by activity in Greater London.

The significant flow of labour into London from Essex and the wider East of England region may, at least in part, be explained by the wage differential between the East and London. Figure 2.4 below shows the median rate of weekly pay for jobs within the three main construction sub-sectors. For 'Construction of Buildings', the median rate of pay in London is £259 per week higher than in the East – a premium of 37%. 'Specialised Construction Activities' also attracts a premium (£158 or 25%), though the premium for 'Civil Engineering' is smaller at £131/week (19%).

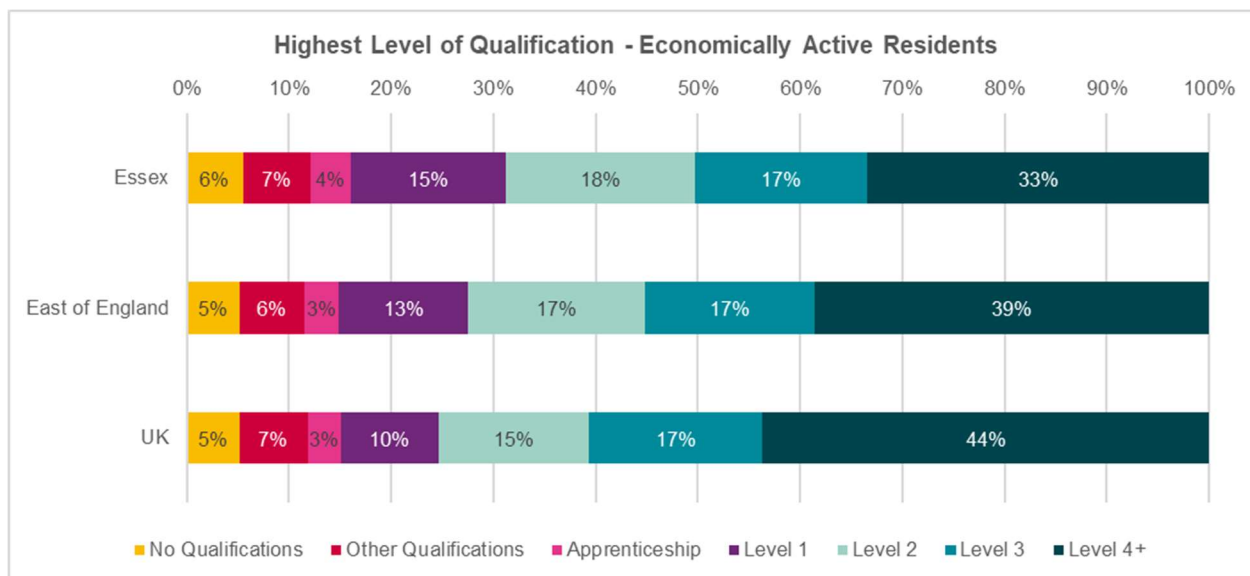
**Figure 2.4: Median Full Time Weekly Pay for Construction Industry Sub-Sectors**

Source: ONS, Annual Survey of Hours and Earnings

Whilst encouraging those currently commuting out of Essex for work to remain in the county could boost the available labour supply significantly, it is likely that increased wages would need to be offered as an incentive, which has the potential to undermine productivity and value for money on public projects. A range of measures are therefore likely to be required to boost labour supply.

### Workforce Skills

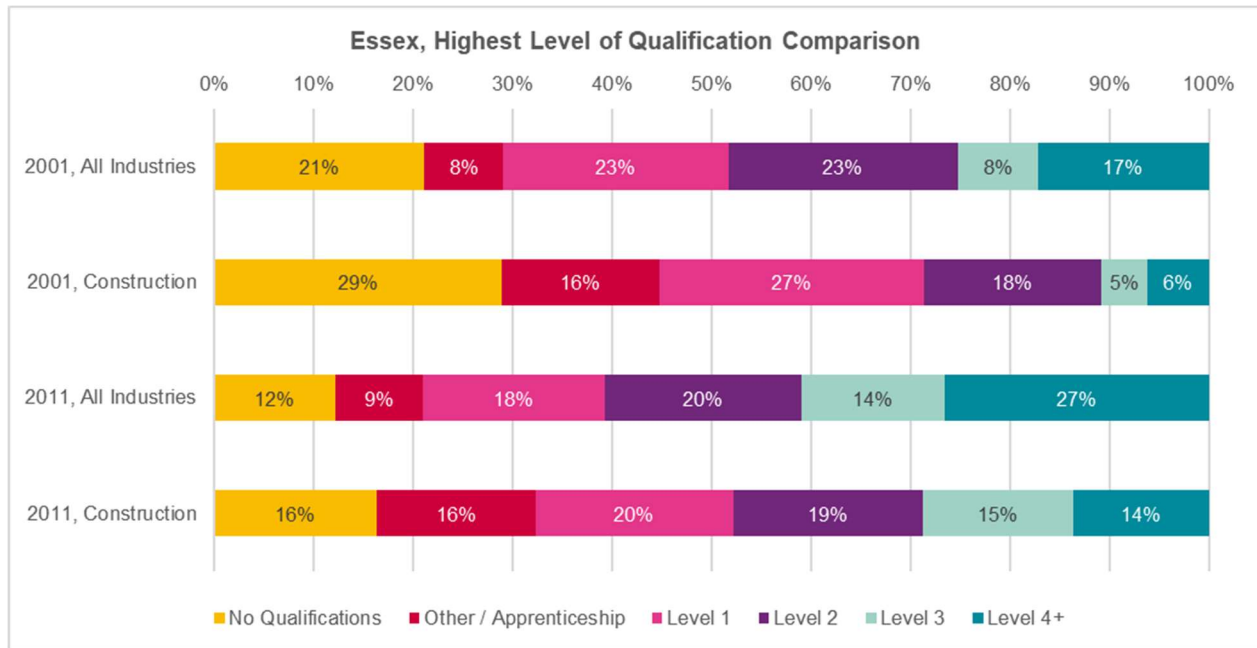
Despite high levels of economic activity and low levels of unemployment, the Essex resident workforce, as demonstrated in Figure 2.5, has relatively low levels of formal qualification. According to ONS data, Essex has higher proportions of working-age residents with no qualifications, NVQ Level 1 qualifications and NVQ Level 2 qualifications than national and regional average, balanced by significantly lower proportions of people with Level 4+ qualifications.

**Figure 2.5: Resident Workforce (all industries) – Highest Level of Qualification**

Source: ONS, Annual Population Survey

Historically, construction industry workers have been observed as having lower levels of formal qualification than the workers across the whole economy, whilst entry level competence is often defined at NVQ Level 1 and 2 where as other related sectors favour levels 2 and 3. This is partly due to many construction operatives obtaining skills through experience and 'time served'; obtaining accreditation through competence-based assessment and qualification and/or recognition through the CSCS card scheme and, therefore, access to working opportunity. Once achieved there is little incentive to seek to progress through formal qualification pathways. There is, however, a trend towards higher levels of qualification in the industry. Figure 2.6 compares the highest level of qualification for construction workers in Essex at the time of the 2001 and 2011 censuses.



**Figure 2.6: Highest Level of Qualification, Census 2001/2011 (Workplace-based)**

Source: ONS, Census 2001/2011

This analysis demonstrates that workers have become more highly qualified over time – most likely due to increasing requirements for construction workers to be formally qualified (to obtain a CSCS card, for example) and the retirement of older workers who attained competence through ‘grandfather-rights’ rather than formal assessment – though it is important to note that ‘grandfather rights’ has been addressed through ‘Experienced Worker’ assessment routes and campaigns to ‘qualify the workforce’. In 2001, just 6% of construction jobs in Essex were filled by workers with Level 4+ (degree or equivalent) qualifications, compared with 14% in 2011. At the same time, the proportion with no formal qualifications declined from 29% to 16%. The gap between construction and the average for all industries for workers with no qualifications declined from eight percentage points in 2001 to four in 2011. It is likely that the 2021 Census will show a continuation in the decline of unskilled workers in the Construction industry.

### Workforce Occupations

The CITB Construction Skills Network (CSN) provides detailed labour forecasting and commentary for the construction industry. Though data is published widely at regional level, CITB deployed an Essex-specific model in producing the report ‘Construction demand and skills analysis for Essex’, published in February 2019. This Essex-specific model provides detail on the baseline composition of the Essex construction workforce broken down into CITB’s bespoke occupation groups (built up from detailed Standard Occupational Classification 2010 codes).

The CSN also provides estimates and commentary around expected change in the size and composition of the construction workforce over time. At the top level, workforce change (according to the 2019-23 UK CSN report) is influenced by the following factors:

- Leakages (outflows) from the sector
  - Transfers to other industries
  - International/domestic out migration
  - Permanent retirements (inc. permanent sickness)
  - Temporary sickness and home duties
- Flows into the sector

- Transfers from other industries
- International/domestic immigration
- Return from temporary sickness and home duties

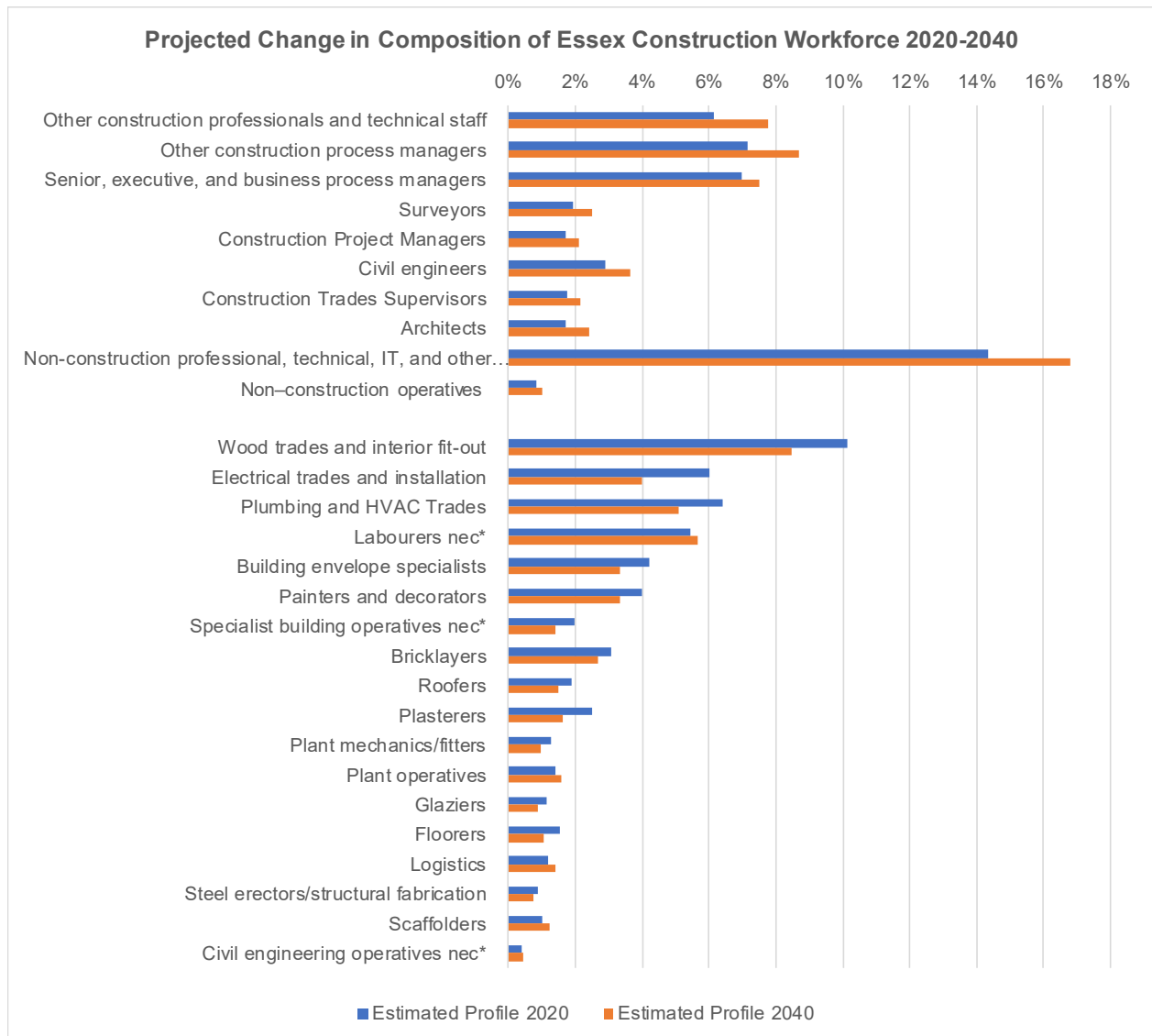
According to CSN, the main reason for both inflows and outflows is transfer between construction and other industries. Another CITB research report, entitled 'Fuller Working Lives' and published in October 2018, further emphasises the challenges faced by the Construction industry in the context of an ageing population:

*"The sector is caught in a vice which is squeezing the employment market at both ends – fewer younger people available, and earlier leaving and retirement in the older age groups. People – and more importantly, skills – lost to retirement or leaving the industry for other reasons represent a double blow for employers who find it increasingly difficult to recruit enough younger staff with the right levels of skill".<sup>3</sup>*

Extrapolating CITB's UK-wide forecasts for change in the composition of the construction industry across the duration of this commission's assessment period provides an indication of how the industry could change over the next 20 years based on CITB assumptions around changes at the occupation level. Figure 2.7 below compares the base year profile for Essex against a potential profile in 2040, based on this extrapolation.

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<sup>3</sup> CITB, Fuller Working Lives in Construction, pp.5-6

**Figure 2.7: Potential Construction Industry Occupation Profile – 2020 and 2040**

Source: CITB/Experian CSN; Mace modelling

This indicates that there is a distinct movement away from Skilled Trades and Manual occupations towards Non-manual occupations – with sharp declines in wood and electrical trades in particular. The largest increase is for 'Non-construction professional, technical and IT', reflecting a broadening of the definition of construction to include a number of occupations not typically associated with the sector. However, it is worth noting there is no decline in the low skilled worker category – labourer – and there is still significant opportunity relating to entry level jobs. The forecast as summarised above forms part of the supply and demand assessment set out in Chapter 4.

## 2.3 Construction Training Outcomes and Provider Landscape

### Training and Apprenticeships

The 2019 'Construction Demand and Skills Analysis for Essex' report by CITB provides a comprehensive analysis of training supply in the county using Education and Skills Funding Agency (ESFA) Individualised Learner Records data.<sup>4</sup> It found that whilst more than 80 different providers had delivered construction-related training within the county, ten training providers dominated the Essex

<sup>4</sup> As the underlying data source has not been updated since the CITB research was published, the analysis has not been refreshed for the purpose of this commission

construction training landscape, delivering 87% of training provision. The top four providers (Chelmsford College, Colchester Institute, Harlow College and South Essex College), accounted for nearly two thirds of provision (63%).<sup>5</sup> The report summarises delivery with a focus on the defined construction occupations, quantifying the number of starts and acknowledging the broad range of programmes delivered.

The CITB research goes on to identify an overall decline in non-apprenticeship construction programme starts in Essex – decreasing by 9% between 2012/13 and 2016/17 compared to 5% for the East region as a whole. However, it also identifies Colchester and Epping Forest as experiencing significant growth in non-apprenticeship construction programme starts over the period (89% and 63% respectively) – this anomaly is, at least in part, likely created through the promotion of short, introductory programmes for craft and trade skills. Importantly, CITB analysis claims that apprenticeship starts in Essex increased by 36% over the same period. The largest increases in starts were seen in Plumbing, Wood Trades, Civil Engineering Operatives, Electrical Trades, Specialist Building Operatives, Other Construction Professionals, Plant Mechanics and Plasterers, with Scaffolders and Painters / Decorators experiencing a decrease. In 2016/2017, Plumbing Trades, Wood Trades and Electrical Trades have the largest numbers of apprenticeships starts.

It is necessary to highlight that whilst the findings of the CITB research identify trends in the sector's training delivery and confirm key assumptions relating to the preference by employers for competence-based qualifications, the report focuses on defined conventions relating to Standard Occupational Classification (SOC) for construction occupations which compromises its use when attempting to define the future skills landscape.

An alternative way to identify trends and opportunities is to understand apprenticeship achievement rates in construction when compared to other related and competing sectors. According to Department for Education data, the overall national average achievement rate for 2018/19 for Level 2 apprenticeships was 64.0% and for level 3 was 66.2%. The apprenticeship landscape is complex, and it is not possible to robustly generate overall numbers of achievement in Essex (available data is reported by provider and not location of cohort, meaning that Essex branches of national providers are difficult to isolate). The following table, taking three key representative FE institutions offering delivery and assessment for Construction Building; Plumbing and Heating; Electrotechnical and Engineering Manufacturing frameworks and standards at Levels 2 and 3, highlights the levels of achievement for 2018/19:

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<sup>5</sup> Construction demand and skills analysis for Essex - CITB

**Table 2.4: Apprenticeship Completion Rates by Institution, Subject Area and Level 2018/19**

Institution Name	Sector Subject Area	Apprenticeship Type	Level	Framework/ Standard	Cohort	Overall Achievement Rate %
Colchester Institute	Building and Construction	Intermediate	2	Construction Building	70	52.2
South Essex College	Engineering	Intermediate	2	Plumbing and Heating	40	52.5
South Essex College	Engineering	Advanced	3	Plumbing and Heating	50	57.4
Harlow College	Engineering	Advanced	3	Electrotechnical	40	59.1
South Essex College	Engineering	Advanced	3	Electrotechnical	40	59.5
Colchester Institute	Engineering	Intermediate	2	Plumbing and Heating	70	64.2
South Essex College	Building and Construction	Intermediate	2	Construction Building	40	66.7
South Essex College	Manufacturing Technologies	Advanced	3	Engineering Manufacture	150	73.0
South Essex College	Building and Construction	Advanced	3	Construction Building	30	74.2
Colchester Institute	Manufacturing Technologies	Advanced	3	Engineering Manufacture	50	74.5

Source: Department of Education - Further education and skills National Achievement Rates Tables: 2018/19

This data highlights that Engineering Manufacturing has a significantly higher overall achievement rate than the other sectors compared. Feedback from stakeholders indicates that this is potentially due to:

- Lower level construction apprentices dropping out because they access higher paid employment within their occupation/sector (this might be linked to NVQ achievement within the apprenticeship and should warrant further investigation if exploring opportunity to develop fast-track routes to competence)
- Manufacturing industries having more secure, structured employment and progression opportunities

When considering the emergence and acceleration of methodologies for off-site, assembly and installation in construction, it is possible to support a scenario where significant parts of the construction sector integrate with manufacturing and fabrication sectors and that the relevant sector classifications, qualification frameworks and standards will need to be further reviewed and reformed to accommodate this. In Essex there are already examples of innovation in training development and qualification design.

### Training Provision

The training landscape across the UK is complex, with many providers offering demand driven solutions nationally and internationally, alongside FE colleges and Universities supporting mainstream provision of taught skills, and higher-level sector, undergraduate and post graduate qualifications. The CITB and Engineering Construction Industry Training Board (ECITB) raise levy from in-scope employers and distribute training-related grants and fund programmes supporting skills development for their respective sectors. CITB has historically delivered specialist 'in-scope' training directly through the National Construction College centres but is currently divesting its delivery services to offer a primary focus on strategy and commissioning.

- In Essex, further education colleges provide a broad range of construction core skills taught courses at Levels 2 and 3 as well as provision of higher-level and degree-level construction courses for technical and professional roles. They also offer a range of apprenticeship standards and technical and engineering qualifications.

- At degree level, the University of Essex offers undergraduate and post graduate engineering programmes with a focus upon digital and communications, whilst Colchester University Centre offers a range of programmes including BSC (Hons) Construction Management programmes in Architectural Technology, Quantity Surveying and Site Management. Anglia Ruskin offer a range of relevant BSc (Hons) including Degree Apprenticeships routes for Civil Engineering, Quantity Surveying and Building Surveying, as well as Digital and Technology Solutions.
- Private sector training providers offer access to specialist occupational and trade training and assessment on demand; CITB and Essex Construction Training Association (ECTA) signpost employers to providers and broker access to training.

### **FE and private training providers**

In Essex, FE core construction skills provision is well established; Chelmsford College, Colchester Institute, Harlow College, and South Essex College being the main examples of FE delivery in the county. Table 2.5 summarises the construction-related courses available at these key local institutions:

Table 2.5: FE Construction Training Provision

Full-time/ Part-time	Apprenticeship (A), Certificate (C), Diploma (D)	Course title	Level	Duration	South	Chelmsford	Colchester (FE Institute and University Centre)	Harlow
FT	D	Multi-Skills (Trades)	1	1yr			y	
FT	D	Brickwork	1	1yr	y	y		y
FT	D	Carpentry and Joinery	1	1yr	y	y		y
FT	D	Painting and Decorating	1	1yr	y	y	y	
FT	D	Design and Tiling Techniques	1	1yr	y			
FT	D	Plastering	1	1yr	y			
FT	D	Construction and Multi Trades	1	1yr	y			
FT	D	Plumbing	1	1yr	y			
FT	D	Electrical Installations	1	1yr	y			
PT	C	Construction Skills (Wall and Floor Tiling)	1	6 -12 wks			y	
PT	C	Construction Skills (Plastering)	1	6 wks			y	
PT	C	Construction Skills (Bricklaying)	1	6 wks			y	
PT	C	Construction Skills (Kitchen Fitting)	1	4 wks			y	
PT	D	Brickwork	1	1yr		y	y	
PT	D	Carpentry and Joinery	1	1yr		y		
PT	D	Painting & Decorating	1	1yr		y		
PT/FT	D	Electrical Installations	1	1yr/35 wks		y		
Tbc	C	Brickwork (basic skills)	1	Flex			y	
Tbc	C	Building Service	1	1yr	y			y
App	D	Carpentry and Joinery	2	18 mnths		y		y
App	D	Property Maintenance	2	1yr			y	
App	D	Brickwork	2	24-30 mnths			y	y
App	D	Welding	2	18 mnths	y			
App	D	Construction Operations and Civil Engineering	2	24 mnths			y	
App	D	Carpentry (site &/or bench)	2	24 mnths	y			y
App	D	Maintenance Operations/Property Maintenance	2	24 mnths	y			y
App	D	Plumbing and Heating	2	2yr				y
FT	D	Brickwork	2	1yr	y	y	y	y
FT	D	Carpentry and Joinery	2	1yr		y		y
FT	D	Painting and Decorating	2	1yr		y		
FT	D	Plumbing	2	1yr	y			
NVQ	D	Site or Bench Joinery	2	EWA			y	y
NVQ	D	Brickwork	2	EWA				y
NVQ	D	Plumbing	2	EWA			y	
PT	D	Brickwork	2	1yr		y		
PT	D	Painting & Decorating	2	1yr		y	y	
PT	D	Site Carpentry	2	1yr	y	y		
PT	A	2d CAD	2	16 weeks (evening)	y			
PT/FT	D	Electrical Installations	2	1yr	y	y		y
	Ext C	Con and the Built Environment	2	1yr	y		y	
App	D	Electrical Maintenance	3	Variable				y
App	D	Installation Electrician	3	42-48 mnths		y		y
App	D	Brickwork	3	Tbc			y	
App	D	Advanced Carpentry and Joinery	3	2yr	y	y		
FT	D	Brickwork	3	1yr			y	y
FT	Ext D	Con and the Built Environment	3	2yr	y	y		y
FT	D	Painting and Decorating	3	1yr			y	
FT	D	Carpentry and Joinery (bench)	3	1yr	y			
FT	C	Plumbing	3	1yr	y			
PT	D	Civil Engineering (CIOB/ICE)	3	2yr		y		
PT	D	Con and the Built Environment	3	2yr		y		
PT	D	Site Carpentry	3	1yr	y	y		
PT	A	2d CAD	3	12 wks	y			
PT/FT	D	Electrical Installations	3	2yr	y			y
PT		HNC Civil Engineering and/or Construction & Built Environment	4	2yr	y	y	y	
FT		Construction Pathway	Entry level 3	1yr	y			

In addition, FE institutions and private training providers are responding to demand in the county for multi-skill and manufacturing construction tailored training programmes.

Harlow College is currently contributing to the development of the following qualifications:

- Pearson BTEC Level 4 Higher National Certificate in Future Homes Design and Construction
- Pearson BTEC Level 5 Higher National Diploma in Future Homes Design and Construction

These qualifications offer opportunity in the county to lead the formalisation of new qualifications supporting the emerging innovation in the sector. The ambition is that students completing these qualifications will progress into employment, or progress to a final year at university. These qualifications are being developed in close collaboration with the Ministry of Building, Innovation and Education (MOBIE) and amongst other national employers, institutions and skills stakeholders.

This innovation offers opportunity in the county to develop capability in emerging methods. 'Early-adoption' is inherently risky; the established sector continues to demand traditional skills and in Essex the demand is established by SMEs within the context of existing provision. This creates a challenge when promoting take-up of new qualifications with no established progression into employment. New qualifications will need to be promoted with clear communication of progression pathways to mitigate the risk of market-failure.

As one of 26 national projects, Harlow College and Public Health England is also supported by the Department for Education, through the CITB Construction Skills Fund (CSF). The Fund is focused on increasing the number of people with construction skills training. The CSF enables Harlow College to provide support for local housebuilding and infrastructure needed locally. The funding supports a mobile, site-based training hub for delivery of apprenticeships, sector work-based academies for job seeking adults, work placements, visits, tasters and school outreach opportunities.

South Essex College, through Prospect College of Advanced Technology offers bespoke training for manufacturing construction. Whilst Chelmsford College and Colchester Institute are actively seeking opportunity to develop their offer to include emerging sector innovation.

As an example of a more diverse approach to building capability, STC, a county-based private/commercial training provider, offer fully funded construction skills training ranging from four main construction areas: Carpentry and Joinery, Wall and Floor Tiling, Painting and Decorating and Bricklaying, as well as Multi-Skills modules. They support sector employers with training and assessment for apprenticeships and offer a commercial recruitment service. Also, and in response to demand from a pioneering manufacturer of modular housing in Essex, STC are currently seeking approval as a provider for NOCN Cskills Awards Level 2 NVQ Diploma in Construction using Off-site Manufacturing Assemblies.

It is important to recognise the contribution other skills stakeholders make in the county. The Essex Construction Training Association (ECTA) is a membership organisation, funded by CITB, working with c.65 Essex construction employers that range in size; the largest member supporting c.600 employees. They offer a dedicated gateway supporting access to low cost training, advisory services and information on funding, legislation, policy and good practice. In addition, members' supply-chain can access low cost delivery where capacity allows. By promoting specialist programmes across its membership framework, ECTA can reduce costs by ensuring maximum capacity of cohort groups attending courses. The Training Association model is supported nationally by CITB and provides an example of how co-ordinated collaboration benefits regional employers.

ECTA is also very active in the promotion of the sector to young people and works with CITB to support education and careers engagement on behalf of its membership and as ambassadors for the sector. They focus on the following key deliverables:

- Deliver high quality, flexible training at the lowest cost,
- Provide the training that members require,
- Keep members updated on current legislation and best practice,



- Be an access point on all aspects of training and grant,
- Organise networking opportunities, discussion forums and seminars,
- Promote the industry to possible new entrants.

TrAC, part funded by CITB and works with their preferred training providers delivering apprenticeships across the South and South East of England. CITB established the Shared Apprenticeship Scheme in 2012; the model allows TrAC to act as employer for construction trade and technical apprentices and secure placements with construction contractors to support work placements. Essex County Council where a 'founding partner' supporting the establishment and continue to influence within its governance. The initiative is employer-led with the specific aim of helping employers who cannot provide the sustained employment over the period to enable completion of an apprenticeship standard.

TrAC support apprenticeship programmes across the spectrum of construction craft and operative occupations and management and supervision as well as graduate apprenticeships; has financial support from around 30 Main Contractor partners, and eight Local Authority partners across the South and South East. Their partners include East Sussex County Council, Essex CC, Norfolk CC, Suffolk CC, Kent CC, Build East Sussex, Build Essex and Build Norfolk. Shared Apprenticeship Schemes are on the whole successful at securing employment for graduating apprentices, TrAC claims to have secured employment for 100% of those successfully completing apprenticeships. However, it is important to assert that achievement statistics are recorded by provider and there are no grounds to assume achievement rates are better, or worse, than established norms.

SECTA is a government-funded training academy that is working to boost construction skills across 3 sites in South Essex. They provide careers advice and employability training as well as skills training, with the ambition to support candidates into work. Their target cohort sits across all ages, levels and backgrounds looking for Office-based, Trade or Graduate roles in construction. SECTA also actively promote the sector to those seeking employment.

Whilst SECTA promote access to office-based careers, degree and graduate opportunities and trade-based skills development, feedback suggests the enterprise as mainly focused upon enabling employability for individuals who have difficulty accessing work. Like other, similar 'academy' approaches, sector training and qualification outcomes tend to be elementary; feedback from recruiters and employers suggests that candidates often fall below the required competence standard for employment and are often not work ready in terms of behaviours and reliability. That said, in terms of a Social Value enterprise, success is often underrepresented and is not appreciable statistically. In a climate of increased unemployment and uncertainty the value of this activity is likely to increase and the support requirements of the cohort will change.

### **HE apprenticeship programmes.**

In addition to a range of under-graduate and post graduate full-time courses the county has experienced a growth in Higher and Degree Apprenticeship provision. The introduction of Higher and Degree apprenticeships offered additional opportunity for work-based learning. However, their introduction has not been without controversy; coupled with the introduction of the apprenticeship levy there have been concerns raised by employment and skills stakeholders that they divert attention away from new-entry employment. The levy system potentially incentivises employers to recover levy by focusing initiatives that would have previously been delivered through part-time taught courses (this provides a level of understand to the feedback from FE stakeholders who raised concerns regarding the impact on courses such as HNCs).

Anglia Ruskin University proactively promote the advantages of work-based degree programmes in the county and have a track record, working in partnership with employers developing degree

apprenticeships. The university has campuses in Cambridge, Chelmsford and Peterborough, university centres in Kings Lynn and Peterborough.; they identify and are responding to the growing demand for distance learning. In 2014 Anglia Ruskin University was awarded 'Entrepreneurial University' of the year at the Times Higher Education Awards. They currently deliver the following sector relevant programmes:

- Chartered Manager Degree Apprenticeship
- Chartered Surveyor (Building Surveying) Degree Apprenticeship
- Chartered Surveyor (Quantity Surveying) Degree Apprenticeship
- Civil Engineering Degree Apprenticeship
- Data Scientist Degree Apprenticeship
- Digital and Technology Solutions Degree Apprenticeship
- Digital Marketing Degree Apprenticeship
- MSc Chartered Town Planner Degree Apprenticeship
- MSc Digital and Technology Solutions Specialist (Data Analytics) Degree Apprenticeship
- MBA Senior Leader Masters Degree Apprenticeship

Anglia Ruskin University are also developing:

- Embedded Electronics Degree Apprenticeship
- Supply Chain Leadership Professional Degree Apprenticeship

The University of Essex is based in Colchester with additional campuses in Southend and Loughton. Essex University has recognised that Degree Apprenticeships offer an opportunity to develop offer in a variety of sectors. To-date the university has focused on three subject areas, Computer Science and Electronic Engineering, Health and Social Care and the Essex Business School.

In addition to a generic MBA Apprenticeship through the Essex Business School, its Computer Science and Electronic Engineering curriculum offers:

- Digital and Technology Solutions Apprenticeship
- Embedded Electronic Systems Design and Development Degree Apprenticeship

University Centre Colchester offers a range of Employer-led standards providing specialist industry-based training, allowing you to acquire higher-level skills that can lead to professional accreditation and membership. University Centre Colchester offers the following Higher apprenticeship standards:

- Operations/Departmental Manager Level 5 (Higher)
- Engineering Manufacturing Level 4 (Higher)
- Electrical and Electronic Engineering Level 4 (Higher)
- Network Engineer Level 4 (Higher)

Degree level apprenticeships are offered in:

- Chartered Manager Degree Apprenticeship
- Manufacturing Engineer Degree Apprenticeship

Anglia Ruskin, Essex University and University Centre Colchester promote their own engagement with employers to develop programmes and standards and provide advice and guidance for employers and candidates.

### Summary

The regional complexity is apparent when considering all sector skills interventions including graduate programmes, trainees and apprentices. It is not uncommon for cohorts in specialist occupations to attend training outside of their local areas; for example, those attending UK universities for professional courses and providers offering specialist skills. The National Construction College has historically offered residential block training for apprentices and trainees from across the UK in many specialist and site supervision and management programmes. Furthermore, workers engaged on large and major projects access upskilling and training specific and local to the projects they are working on - for example, for the nuclear new build project at Hinkley Point C in Somerset, where considerable training occurs supporting the competence requirements for the project – and large sector employers run internal and external programmes. It is therefore not possible to define an absolute measure of supply for the county, sector education and training being demand driven and with access to national network of providers.

In this context it would be desirable to seek a route to align the counties offer, mitigate competing commercial priorities and capability demands in training delivery as well as support an allied approach that can broker targeted delivery for current and promote opportunity in the emerging demands of the sector.

### 3. Growth Agenda and Major Project Pipeline

Having established the key baseline characteristics of the Essex construction industry and training landscape in Chapter 2, Chapter 3 identifies key pipeline projects which have potential to create construction labour demand above and beyond baseline ‘business as usual’ levels of demand. This includes a variety of large-scale housing projects, improvements to transport infrastructure and major new healthcare facilities, as well as two major projects of national importance.

#### 3.1 Regional Strategic Growth Agenda

##### **South East Local Enterprise Partnership Economic Strategy Statement – Smarter Faster Together (December 2018)**

The South East Local Enterprise Partnership (SELEP) Economic Strategy Statement, entitled ‘Smarter, Faster, Together’, provides an overview of the key issues and priorities affecting the LEP (whose geographical remit includes Essex, Kent and East Sussex) and its members. This document precedes the LEP’s emerging Local Industrial Strategy, which is in development at the time of writing.

The Statement highlights the contribution made by the LEP area to the UK economy (contributing 5% of UK Gross Value Added), as well as the challenges faced in improving productivity (currently 8% below national average), accommodating rapid population growth and delivering required infrastructure. It also highlights the need to ensure that local businesses are fully equipped to respond effectively to innovation and technological change.

In response to these issues, SELEP identifies five key priorities for the five years following publication:

- **Creating ideas and enterprise** – encouraging innovative businesses to scale up, and increasing the adoption of new technologies and processes;
- **Developing tomorrow’s workforce** – improving the industry-relevance of qualifications, enhancing awareness of career opportunities and supporting capital investment in delivering FE/HE capacity;
- **Creating places** – including through support for developing the economic narrative of new garden communities;
- **Accelerating infrastructure** – including through support for national infrastructure projects/improvements, investing in digital and advanced technology and supporting new approaches to delivery (including off-site construction); and
- **Working together** – through building stronger relationships with neighbours across the region and through supporting the development of a new narrative for the Thames Estuary.

The Strategy identifies key projects which are likely to make a significant impact on the LEP area in the coming years, including:

- Lower Thames Crossing, linking Essex with Kent;
- Improvements to other major road corridors (including A13, A127, A12, A120, A133 and M11 in Essex);
- The opening of Crossrail in Essex and its potential south eastern extension to Ebbsfleet (Kent);
- New garden settlements at Ebbsfleet in Kent alongside the North Essex Garden Communities and Dunton Hills in Essex and Gilston in Hertfordshire (adjacent to Harlow in Essex);
- Bradwell B in Essex; and
- Offshore Wind Farms in the Thames Estuary.

In summary, the SELEP strategy reflects a desire to improve productivity in the region through enhanced skills provision (closely aligned with the needs of employers) and responding positively to the opportunities created by the regional growth agenda and advances in technology.

### Essex Growth and Infrastructure Framework (2016)

The Essex Growth and Infrastructure Framework (GIF), prepared by AECOM in 2016 on behalf of the Essex Local Authorities, provides a comprehensive assessment of growth in the wider County over the period 2016-2036, and identifies the infrastructure required to support this growth. This includes infrastructure in Education, Health and Social Care, Community, Green Infrastructure, Utilities, Transport, Flood Defences and Emergency Services. The GIF also identifies several major projects which are likely to impact on Essex and fall within the scope of this commission.

In terms of Strategic Housing Sites, the GIF notes that many of the major sites identified are located along strategic corridors:

- **A12 and Great Eastern Mainline Corridor** (Brentwood-Chelmsford-Colchester), with a number of large-scale urban extensions around Chelmsford;
- **A120 Haven Gateway Corridor**, including the North Essex Garden Communities (East of Colchester, West of Colchester and West of Braintree);
- **M11 London Stansted Cambridge Corridor** – with a number of strategic housing sites surrounding Harlow; and
- **A127 and A13 Corridors**, with notable sites in East and West Basildon.

As well as major housing sites, the GIF identifies several major transport infrastructure projects due to take place within Essex before 2036, including:

- Lower Thames Crossing;
- A120 Braintree to A12;
- M11 Junction 7a;
- Chelmsford North East bypass A130;
- A12 Chelmsford to A120;
- M25 Junction 28;
- North Essex Rapid Transit; and
- Beaulieu Park Station and Road Infrastructure.

Additionally, other major developments are identified, including:

- Public Health England facility at Harlow;
- Bradwell B;
- Stansted Airport transformation programme; and
- Tilbury 2 port expansion.

Finally, the GIF also identifies a number of wider regional projects which could impact on infrastructure capacity in Essex. These include:

- Strategic housing sites including Ebbsfleet Garden City in North Kent, Cambridge Urban Extensions, Northstowe New Town (Cambs), Meridian Water (Enfield) as well as the Gilston area sites to the north of Harlow;

- Strategic employment developments, including Ebbsfleet Central and Paramount Park (now The London Resort) in North Kent;
- New river crossing at Silvertown (London);
- Nuclear power plant at Sizewell (Suffolk);
- East Anglia Offshore Wind projects; and
- High voltage electricity connection between Bramford in Suffolk and Twinstead in Essex.

### Nationally-Significant Infrastructure Project Pipeline

The Planning Inspectorate lists Nationally-Significant Infrastructure Projects (NSIPs) on its website, which are at varying stages in the Development Consent Order process. The following projects are located within Essex:

Project	Status	Expected Application Date
Bradwell B new nuclear power station	Pre-Application	2022
Oikos Marine & South Side Development	Pre-Application	Q1 2021
Lower Thames Crossing	Pre-Application	Summer 2020
Tilbury Energy Centre	Pre-Application	TBD - Project Frozen by Developer
Tilbury2	Decided	Decided February 2018
M25 Junction 28 Improvements	Pre-Application	Q2 2020

Of these projects Bradwell B and Lower Thames Crossing are by far the most significant in terms of value and scale of likely workforce requirements, whilst M25 Junction 28 forms part of a wider programme of major planned highways improvements under Highways England's Road Investment Strategy 2 (RIS2) for the period 2020-2025. Oikos Marine, and Tilbury Energy Centre are smaller in scale, whilst the Tilbury 2 project is in delivery and close to completion. In addition to these Essex-based projects, a number of significant projects in neighbouring areas have also been listed. The closest and most significant of these projects are listed below.

Project	County	Status	Application Expected
Expansion of London Luton Airport	Bedfordshire	Pre-Application	Mid-2020
A428 Black Cat to Caxton Gibbet Road Improvement Scheme	Cambridgeshire	Pre-Application	Summer 2020
The London Resort (pre-application stage)	Kent	Pre-Application	Q4 2020
Riverside Energy Park	London	Decided	Granted April 2020
Silvertown Tunnel	London	Decided	Granted May 2018
Thames Tideway Tunnel	London	Decided	Granted September 2014
Expansion of Heathrow Airport (Third Runway)	London	Pre-Application	Q4 2020 (likely to be delayed by high court ruling)
Heathrow West	London	Pre-Application	Q1 2021
Sizewell C	Suffolk	Pre-Application	April 2020 (delayed by Covid-19)
East Anglia Two Offshore Windfarm	Suffolk	Pre-Application	Preliminary Hearings delayed by Covid-19
Nautilus Interconnector	Suffolk	Pre-Application	Q2 2022
Progress Power Station	Suffolk	Decided	Granted July 2015; New Application being prepared
Sunnica Energy Farm	Suffolk	Pre-Application	Q2/Q3 2020
Bramford to Twinstead Overhead Line	Suffolk / Essex	Pre-Application	On Hold - Not Required until early 2020s
Gatwick Airport Northern Runway	Sussex	Pre-Application	TBD

Of these major projects in neighbouring areas, the most significant pipeline projects are expected to be Sizewell C and East Anglia Two (both Suffolk); Heathrow Airport Expansion and Silvertown Tunnel (both London) and the London Resort (Kent). Thames Tideway Tunnel is currently under construction, whilst expansion of Gatwick and Luton is likely to be affected by the severe impact of Covid-19 on the global aviation sector.

### Emerging New London Plan

The emerging New London Plan, which serves as the key strategic plan for Greater London, sets an overall housing target of around 65,000 new homes per year.<sup>6</sup> This includes nearly 12,000 new homes per year in outer North East London boroughs (nearest geographically to Essex), and 2,161 per annum in the QEII Olympic Park (London Legacy Development Corporation), where Modern Methods of Construction (MMC) are already being used to deliver homes more productively.<sup>7</sup> Across London as a whole, this proposed housing target is double the current typical rate of housing delivery of around 30,000 per year. To meet this need for housing, it is likely that a boost in the construction labour supply will be required, alongside adoption of new technologies and approaches to construction to drive productivity.

## 3.2 Essex Major Project Pipeline

Having identified several key projects which are expected to be brought forward for construction during the assessment period of 2020-2040, further research has been undertaken to ascertain which projects meet the criteria set out in the introduction to this report (value in excess of £50m, with a significant proportion of the project delivered between 2020 and 2040 and a completion year of 2021 or later). The following projects within Essex meet these criteria:

**Table 2.6: Major Non-Housing Projects Identified**

Project Name	Assumed Value	Assumed Start	Assumed Completion
<b>£1bn+ Projects</b>			
Bradwell B	£15bn	2025	2036
Lower Thames Crossing	£6.8bn	2022	2027
<b>Highways Projects</b>			
A12 to A120	£250m	2023	2028
A120 Braintree to A12	£555m	2026	2029
M25 Jct 28	£100m	2022	2023
M11 Jct 7A	£50m	2020	2022
Tendring - Roads A120-A133	£111m	2021	2024
<b>Other Major Projects</b>			
North Essex Rapid Transit	£233m	2024	2040*
Beaulieu Park - Station/Bypass	£157m	2021	2025
PHE Harlow	£400m	2019	2031
Stansted Airport Expansion	£570m	2021	2028

\*Additional phases expected to be delivered beyond this date in support of Garden Community

A number of major housing sites have also been identified. These are summarised in the table below.

<sup>6</sup> GLA, Draft New London Plan, Table 4.1

<sup>7</sup> See, for example, the Mace Jump Factory concept



Table 2.7: Major Housing Sites Identified

Project Name	Total Units	Start Date	Units by 2040
West of Braintree	7,000-10,000	2023	4,500
Colchester Braintree Borders	15,000-24,000	2023	4,500
Tendring Colchester Borders	7,000-9,000	2023	4,500
North Uttlesford	4,820 within plan period, 13,680 post plan period	2023*	4,025
Easton Park		2023*	4,025
West of Braintree (Uttlesford)		2026*	2,020
Harlow and Gilston	17,647	2018	12,568
Chelmsford Garden Village	5,000-10,000	2023	4,154
Dunton Hills	c. 4,000	2023	4,533

\*Uttlesford Local plan appears likely to be withdrawn. These sites have therefore been removed from the analysis.

In summary, the pipeline of major projects is substantial. The housing sites are expected to deliver around 35,000 new homes (excluding Uttlesford sites) by 2040, whilst the non-housing sites represent an investment in the region of around £24bn. The extent to which this significant pipeline of activity can be accommodated by the Essex construction workforce is considered in detail in the next chapter.



## 4. Supply and Demand Assessment

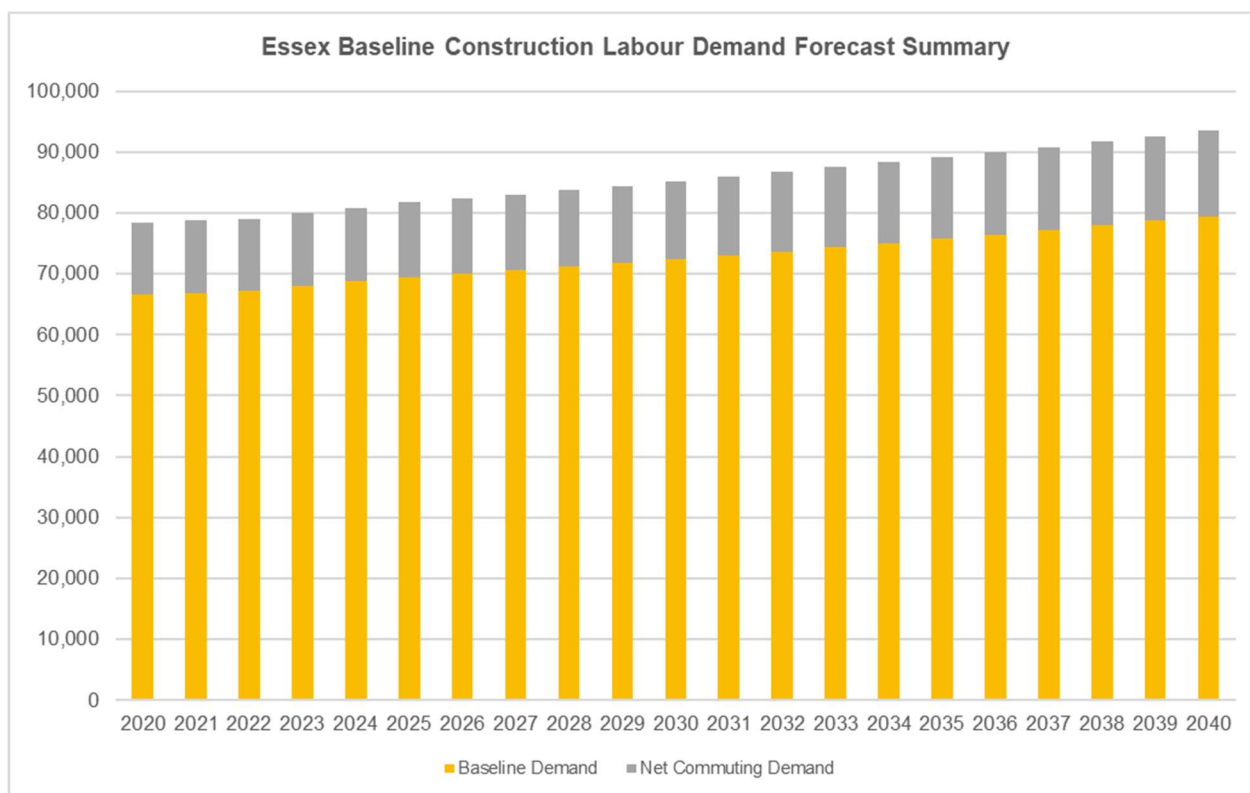
The major projects identified in the previous chapter have the potential to add significantly to baseline, ‘business as usual’ demand for construction skills in Essex during the assessment period. To predict the scale and timing of this impact, a labour supply and demand modelling exercise has been carried out.

Firstly, the baseline for construction labour demand is defined, using data from ONS and CITB. Next, the demand-side impact of the identified major projects is estimated using data from a variety of sources; as most of the major developments identified are either in early planning stages or of insufficient scale to warrant the publication of project-specific skills assessments, analogues and forecasting tools have been used in the absence of project-specific forecasts. The likely supply of labour is then estimated, using robust and prudent assumptions about the likely pace of construction workforce growth without intervention. Finally, the supply and demand profiles are compared to identify potential gaps – both at the aggregate level and at occupation level.

### 4.1 Baseline Construction Labour Demand

Figure 4.1 summarises projected baseline labour demand in Essex over the period 2020 to 2040, in addition to the net flow of commuters (to represent demand from outside of the Essex border that is met by workers residing in Essex).

**Figure 4.1: Baseline Construction Labour Demand**



Source: Cambridgeshire Insight, EEFM (2017)

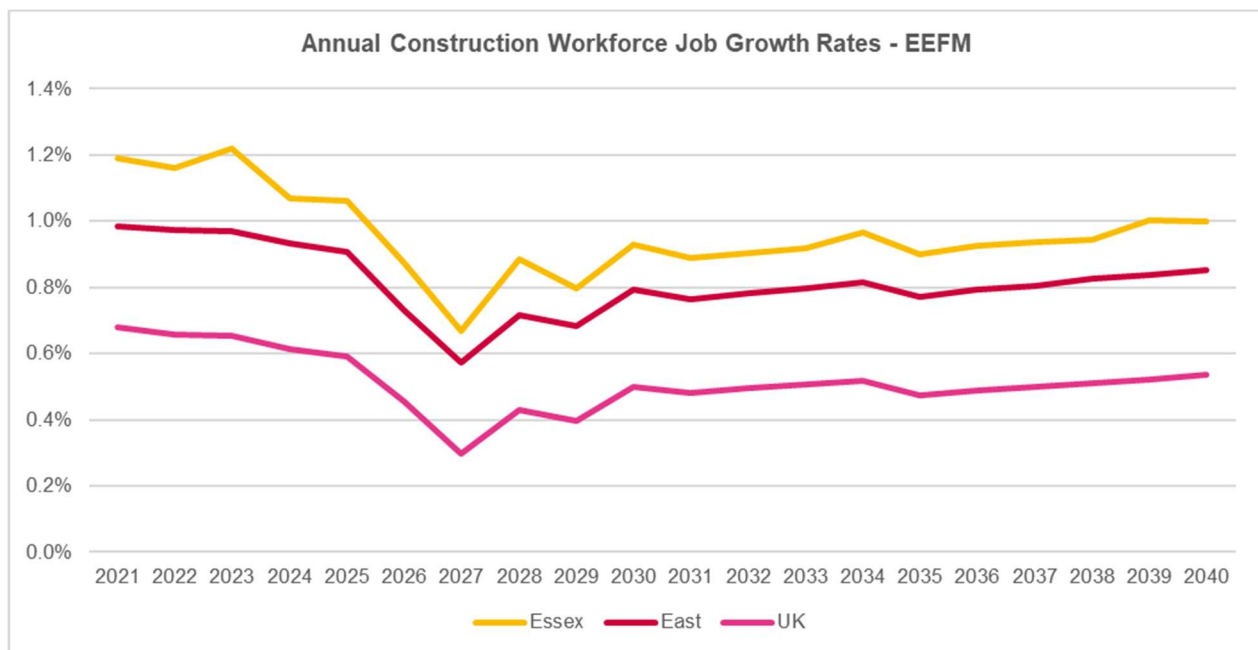
The baseline demand in the first three years of this projection are derived from research carried out by CITB/Whole Life Consultants (WLC) on behalf of ECC.<sup>8</sup> The baseline level of demand indicated within the CITB/WLC research (66,600 in 2020) is broadly consistent with the volume of construction jobs in

<sup>8</sup> CITB/WLC, 2019, 'Construction Demand and Skills Analysis for Essex'

Essex identified through analysis of ONS Annual Population Survey data in Chapter 2 (which shows an average of 69,250 construction jobs in Essex over the last 5 years). This is therefore considered to be a robust starting point for the assessment.

To account for growth in this baseline demand, likely to arise as the population and economy grows (and therefore creates demand more domestic and commercial construction work), the East of England Forecasting Model (EEFM), prepared by Cambridge Econometrics on behalf of Cambridgeshire Insight, has been consulted. The EEFM provides a forecast of workforce jobs by industry sector, including a forecast for the construction industry. Figure 4.2 below summarises the construction workforce job growth rate forecasts for Essex, East of England and UK, based on the EEFM.

**Figure 4.2: EEFM Construction Workforce Job Growth Rates**



Source: Cambridgeshire Insight, EEFM (2017)

The EEFM forecasts construction sector growth in Essex significantly in excess of national average, with annual employment growth of c. 1.2% in the early years of the forecast before settling between 0.8% and 1.0% per annum from 2028 onwards. Though this growth rate is relatively high compared with regional and national average, it remains lower than the growth rate of c. 1.4% per annum observed between 2010 and 2020. It is therefore considered to be a sufficiently realistic outlook for the purpose of this modelling exercise. Applying this growth rate to the baseline levels of demand indicated in the CITB research results in a baseline demand of 79,500 at the end of the study period (2040) – an increase of 12,900 over 20 years.

The analysis of ONS APS data in Chapter 2 also highlighted that the size of the resident construction workforce in Essex consistently tracked above the number of available jobs in the county, reflecting the significant numbers of people commuting out from Essex to Greater London and elsewhere. The average size of this gap (11,750 over the last five years) accounts for approximately 15% of the resident construction workforce in Essex. It is likely that London and other areas such as Cambridgeshire will continue to rely on Essex to supply construction labour to help meet their demands, and it has been assumed that this out-flow of 15% will remain static over time within this central scenario. A sensitivity test of this assumption is carried out in Chapter 5 to assess the impact that a significant increase in demand from London might have on the supply and demand balance in Essex.

Incorporating the net outflow of commuters, total baseline construction labour demand is expected to grow from 78,400 in 2020 to 93,500 in 2020. This, in itself is a significant increase, with the construction workforce needing to grow by an average of c.750 workers per annum to meet forecast baseline demand against a backdrop of skills decay, an ageing workforce and difficulties faced in attracting new entrants to the industry.

It is important to note that this forecast relies on the EEFM outputs from 2017, and as such assumes a relatively optimistic outlook (though tempered by Brexit-related uncertainty). Covid-19 represents a downside risk to this growth rate, but at this early stage it is difficult to predict with any certainty how significantly the construction industry will be affected in the short term. It is recommended that this analysis is updated as new robust forecasts become available.

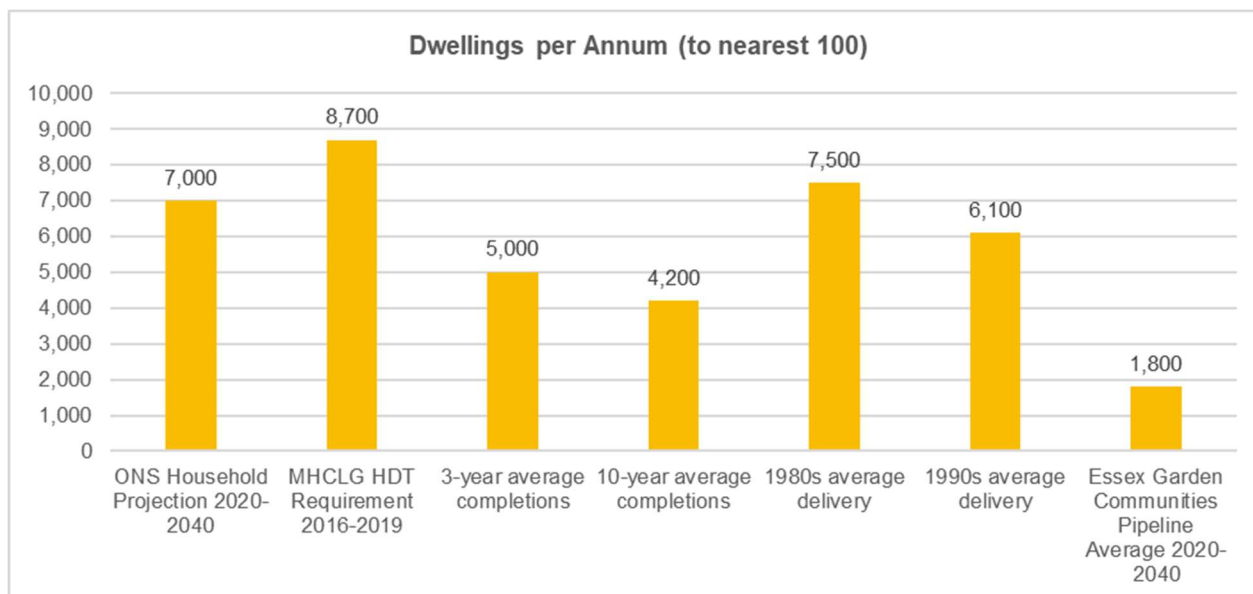
## 4.2 Major Projects Labour Demand

Having defined baseline demand, the anticipated level of additional demand associated with the pipeline of major projects now needs to be quantified.

### New Garden Communities

The new Garden Communities identified within Chapter 3 represent a coordinated response to Essex's growing housing needs. These new settlements are likely to be delivered over a significant period of time and represent an opportunity to meet housing needs in a controlled manner. Based on evidence gathered on the likely delivery trajectory of these developments, it is estimated that an average of 2,100 dwellings per annum will be delivered over the period 2020-2040.

To understand the extent to which these new homes can be considered 'above trend', and therefore not accounted for within baseline demand, we have analysed housing completions achieved in the county in recent years and compared them against housing need. This analysis is summarised in Figure 4.3 below.

**Figure 4.3: Comparison of housing need against historic delivery rates**

Source: MHCLG, ONS, Essex Local Authorities

Over the last 3 years, an estimated 5,000 dwellings per annum in total have been completed within Essex – an increase on the longer term (10 year) average delivery rate (4,200 units per annum).<sup>9</sup> The baseline for assessing housing need, the ONS Sub-National Household Projections, indicate average increase in the number of households within Essex of 7,000 per annum over the course of the assessment period.<sup>10</sup> The ONS projections are then adjusted to take account of the need to boost the supply of housing and improve affordability. According to the most recent Housing Delivery Test results published by the Ministry for Housing, Communities and Local Government (MHCLG), the 14 Essex local authorities (including Thurrock and Southend) have a combined housing requirement (for the period 2016-2019) of 8,700 net additional dwellings per annum.<sup>11</sup>

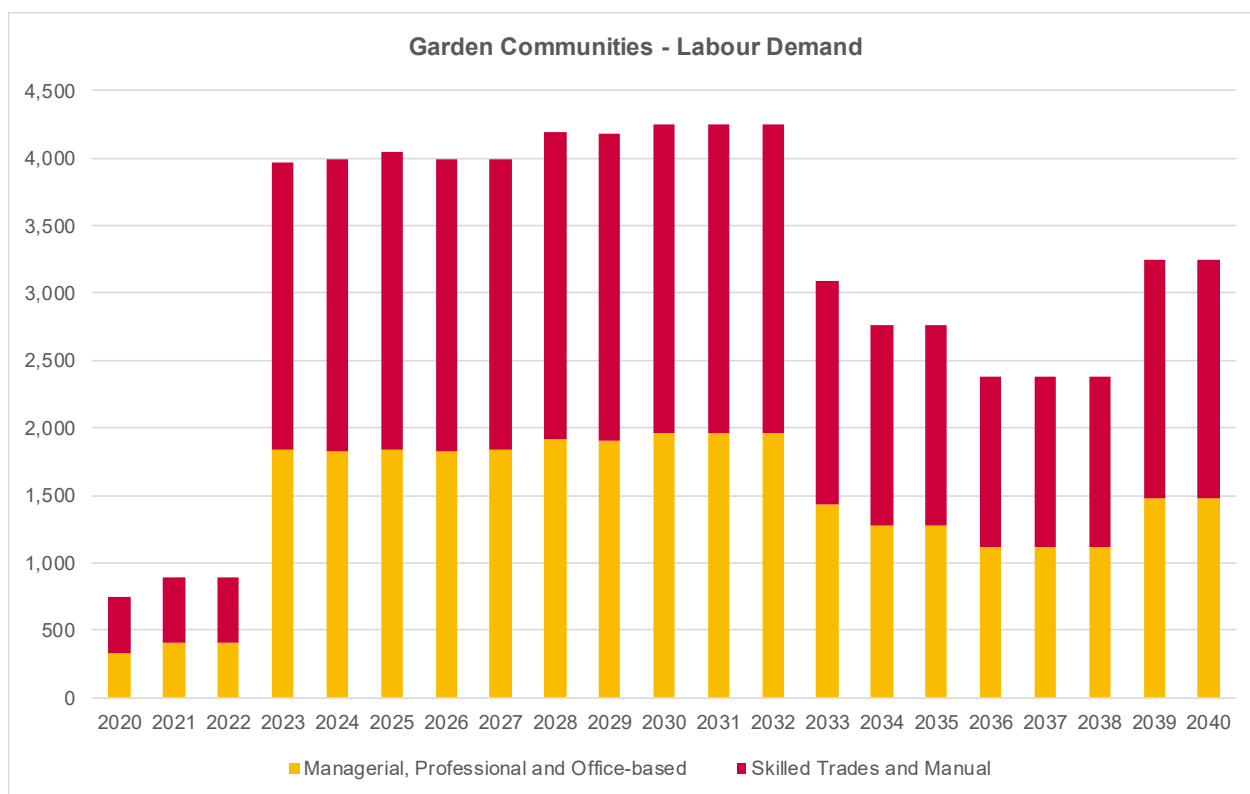
On the basis that delivery rates in recent years fall at least 2,000 homes per annum short of even the most basic definition of housing need, and 3,700 short of the figured stated within the MHCLG Housing Delivery Test, the delivery of New Garden Communities in Essex is likely to create additional labour demand above the level that is currently embodied in the baseline demand estimate.

To estimate net additional demand associated with the delivery of six new Garden Communities, the CITB Labour Forecasting Tool (LFT) has been used. The LFT incorporates evidence from a wide range of actual projects across the country to predict the likely number of jobs created (broken down into CITB's occupational groups) by projects based on their value, type and duration, alongside locational factors. Figure 4.4 below summarises the scale of labour demand expected to be created by these projects, with a breakdown by broad role type.

<sup>9</sup> MHCLG, Live Table 253

<sup>10</sup> ONS, Household Projections for England

<sup>11</sup> MHCLG Housing Delivery Test, 2019 Measurement

**Figure 4.4: Garden Communities – Labour Demand by Broad Role Type**

Source: CITB LFT

Based on this modelling, the construction peak is expected to be reached in 2030, with a total demand for 4,250 workers (1,960 Managerial, Professional and Office-based, and 2,290 Skilled Trades and Manual). However, significant levels of demand are expected to continue to the end of the assessment period and beyond, on the basis that many of the New Garden Communities proposed are 40+ year projects. Whilst some early delivery is expected at Harlow and Gilston, most of the projects analysed are at planning stage, and the delivery programmes for these projects are inextricably linked with the progress of new local plans. As such, there is potential for this demand to shift towards the latter part of the assessment period should progress in adopting these new local plans be delayed.

### Major Infrastructure Projects (expected value <£1bn)

In addition to the New Garden Settlements, a number of major non-housing projects were also identified. Again, these projects are expected to create demand for construction labour above and beyond the baseline (which, for the purpose of this assessment, has been assumed to include an element of 'business as usual' infrastructure upgrades and maintenance). The projects included within this analysis are as follows:

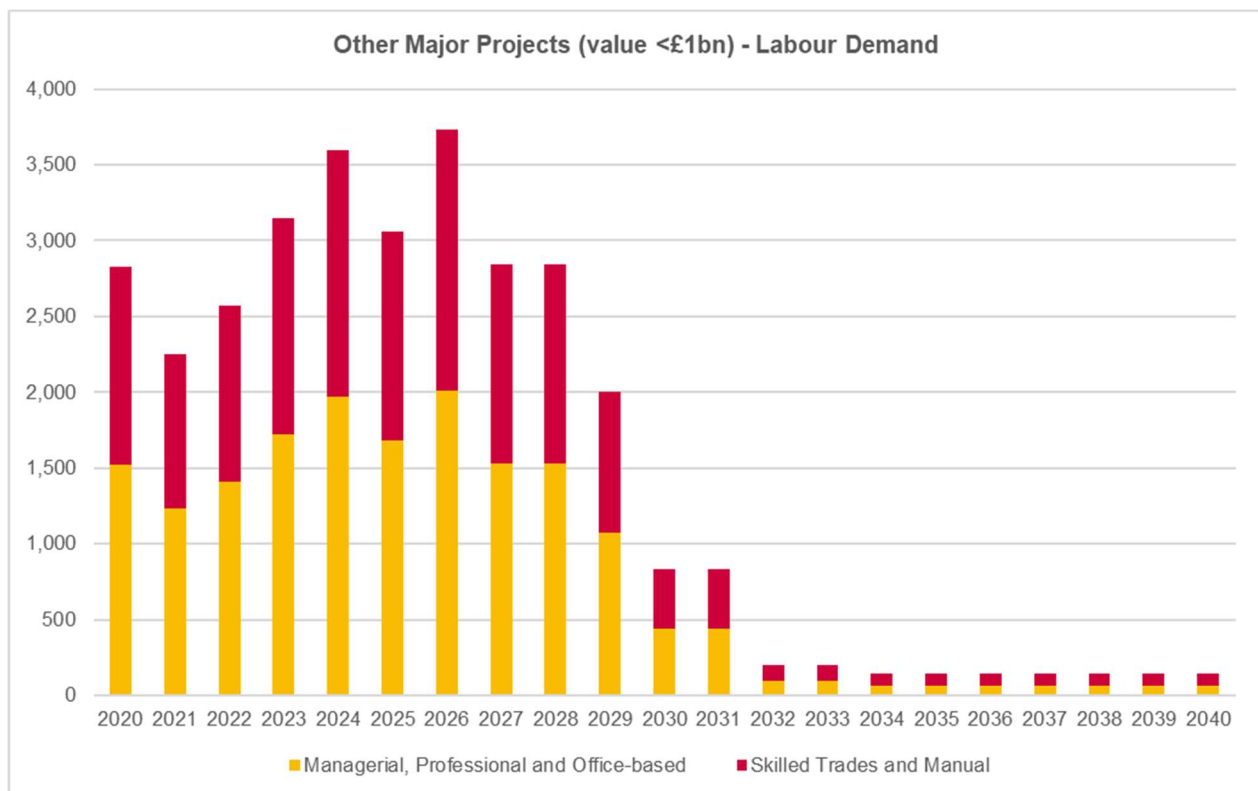
- A12 to A120 improvements
- A120 Braintree improvements
- A120-A133 Tendring improvements
- A13 widening
- Beaulieu Park station and road connections
- M11 Junction 7a improvements
- M25 Junction 28 improvements
- North Essex Rapid Transit

- Public Health England, Harlow
- Stansted Airport Expansion Programme
- Tilbury 2

As with the New Garden Settlements, the CITB LFT has been used to estimate labour demand for these projects. Bradwell B and Lower Thames Crossing, with values that exceed £1bn, have been assessed separately.

Figure 4.4 below summarises model outputs for these projects (excluding BRB and LTC) in aggregate.

**Figure 4.4: Other Major Projects (value <£1bn) – Labour Demand by Broad Role Type**



Source: CITB LFT

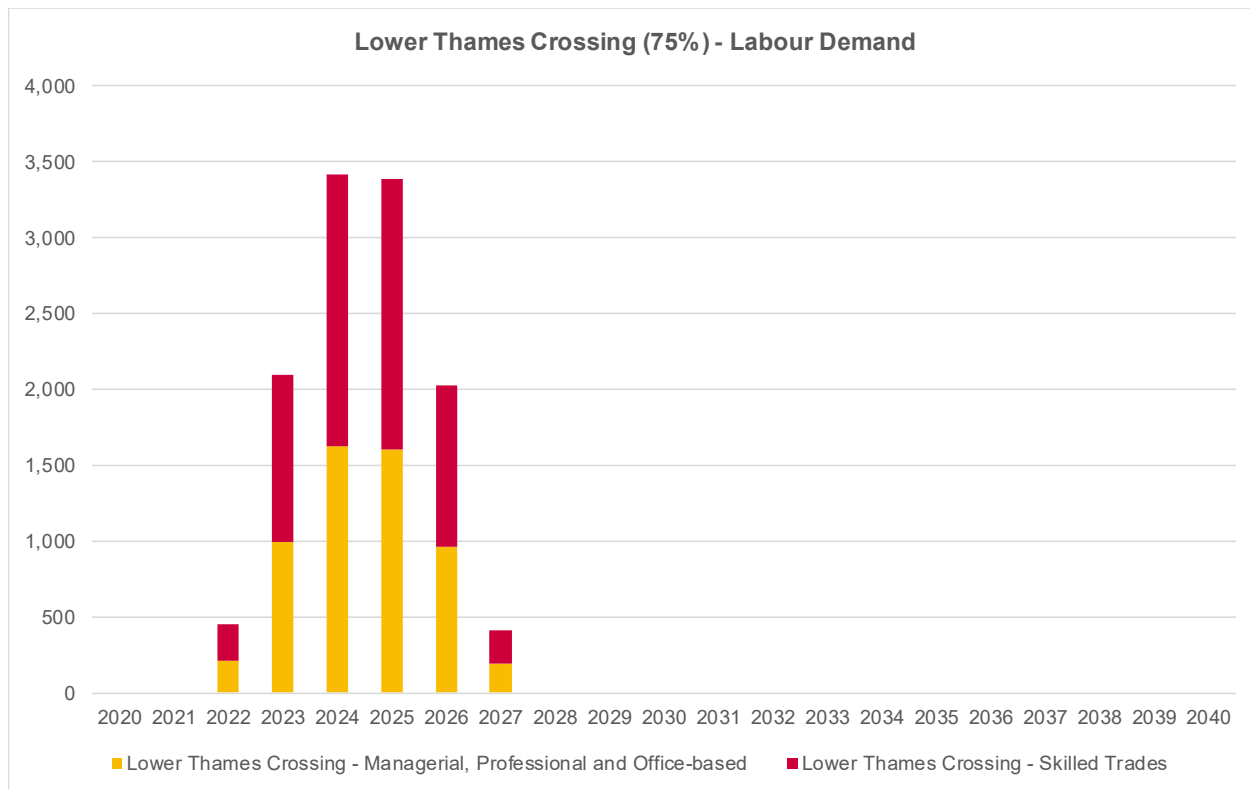
The combined peak labour demand has been estimated at 3,730 in 2026, with demand for around 2,000 non-manual roles and 1,700 manual roles. Most of the projects identified that fall into this category are expected to take place during the first 10 years of the forecast. It is likely, however, that the later pipeline will grow over time – particularly as new strategic road construction plans emerge. This analysis should therefore be updated periodically to understand the impact of changes in the project pipeline.

### Lower Thames Crossing

The Lower Thames Crossing (LTC), along with Bradwell B, will be one of the largest infrastructure projects to take place within Essex in a generation, though it is likely that home-based construction labour will be drawn from Kent as well as Essex, given that the project connects the two counties. For the purpose of this assessment, it has been assumed that 75% of the project's value relates to activity on the Essex side of the estuary (including tunnel construction) on the basis that tunnelling is expected to travel from north to south, and the greater degree of complexity and scale of the roads connecting

the tunnel to the rest of the Strategic Road Network. Figure 4.5 below summarises the estimated labour demand associated with 75% of the LTC project value. Labour demand in this instance has been calculated using labour coefficients derived from ONS data, with an occupation-level breakdown based on evidence from other major highways projects.

**Figure 4.5: Lower Thames Crossing (75%) – Labour Demand by Role Type**



Source: ONS Annual Business Survey, CITB LFT, Mace modelling

It is estimated that LTC's peak projected labour demand (3,420 – based on 75% of project value) will fall within the third year of the project (2024 based on the indicative project programme). A similar profile of demand (though smaller in scale) could be expected in Kent, though the actual division of labour demand between the two counties will depend on the location of supply chain businesses used and the availability of labour.

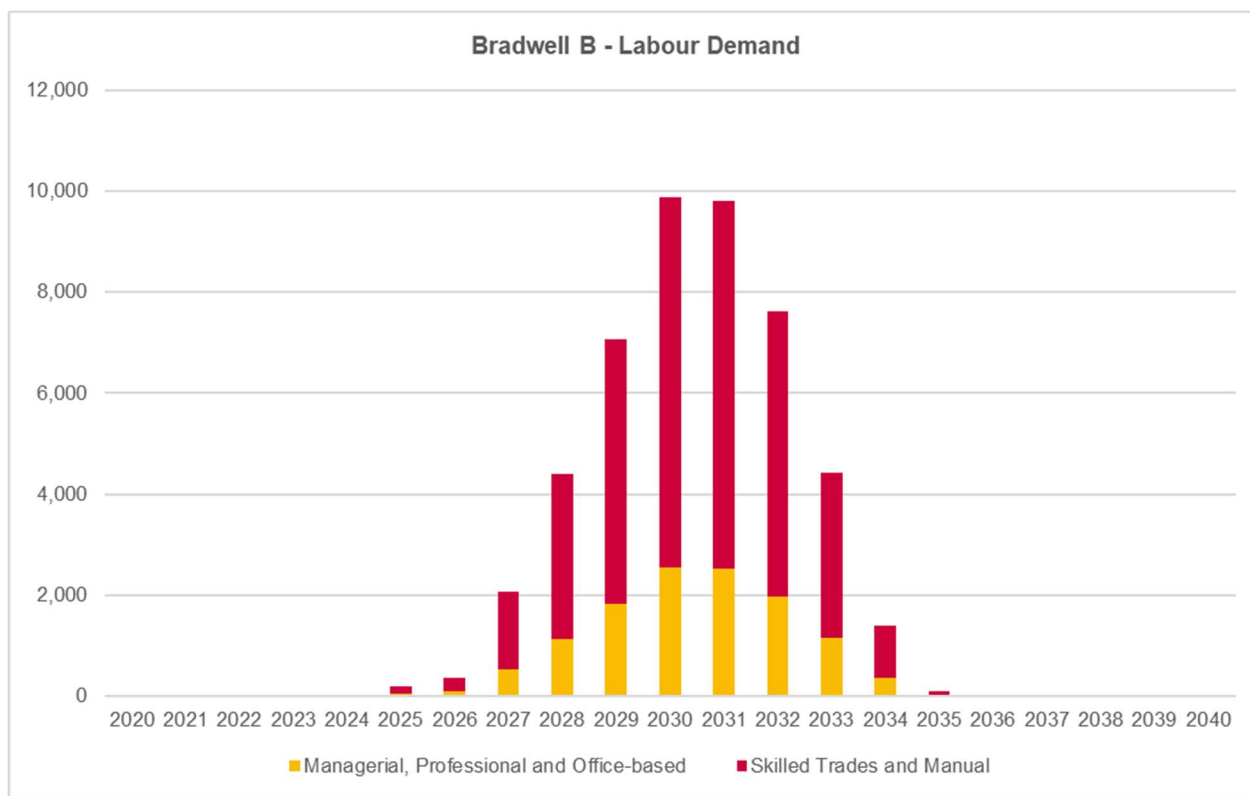
In undertaking this commission, Mace sought to engage with the LTC project team to establish a project-specific understanding of labour and skills requirements. However, as the project team is not yet fully formed, with no specific workforce modelling undertaken, the scale and composition of demand has had to be estimated. As plans for LTC progress, it will be important to understand the specific requirements for the project, with a particular focus on the tunnelling phase – a key area where the LTC project deviates from a typical road construction project. The figures presented above should therefore be considered indicative.

## Bradwell B

The final major project assessed is Bradwell B (BRB). With an estimated value of £15bn, BRB is expected to be one of the largest infrastructure projects delivered in the UK over the next two decades, alongside other nuclear new build projects (Hinkley Point C, Sizewell C) and major transport infrastructure projects such as HS2. Preliminary figures for top-level labour demand published as part of the Stage One BRB consultation, alongside additional unpublished detail on potential occupation-level requirements shared with ECC by CGN/EDF, have been used to estimate the scale and

approximate composition of labour demand associated with BRB. Please note that operational phase jobs (involved in the running of the power station on completion) have been excluded from this analysis.

**Figure 4.6: Bradwell B – Labour Demand by Role Type**



Source: Mace modelling, CGN/EDF Energy

Whilst the workforce for BRB is yet to be forecast it is likely to be analogous to HPC and SZC in terms of occupations. The overall workforce demand for BRB will impact regional and UK employment forecasts with impact upon civil engineering, construction and engineering construction sectors. At HPC, considerable preparation was undertaken to define job families and role types across supply chains in order to rationalize demand forecasting and establish competence frameworks.

EDF have used the following phasing and construction job families/occupations, aligned to HPC modelling during engagement in Suffolk for Sizewell C and in Essex relating to BRB:

<b>Phase one:</b> Earthworks	Plant operators Project managers Earthworks operators
<b>Phase two:</b> Civil construction	Steel fixers Facilities management Construction supervisors Logistics Crane and Lifting operatives Concrete operatives Carpenters and Formworkers



## Supply and Demand Assessment

<b>Phase three:</b> Mechanical, electrical and air conditioning	Mechanical and Electrical Engineers HVAC Engineers Skilled Welders (high integrity)
<b>Phase four:</b> Commissioning	Maintenance Engineers Electrical and Instrumentation Engineers Cable pullers
<b>Phase five:</b> Site clearance and landscaping	Landscapers Grounds Maintenance

This clearly, only provides a high-level view of the construction, engineering construction and Mechanical, Engineer and Heating (MEH) workforces. A more detailed breakdown across HPC supply chain for construction, civil engineering MEH would identify a more granular breakdown:

<b>Construction</b>	General Operatives Temp Buildings Operatives Scaffolders and Access Operatives (inc. for MEH) Electricians Plant Fitters Plant Mechanics Plant Operatives: <ul style="list-style-type: none"> <li>• Dump truck</li> <li>• Crawler/Mobile Crane</li> <li>• Concrete Pump</li> <li>• 360 Excavators</li> <li>• Tower Crane</li> </ul>
<b>Civil Engineering</b>	Lifting Supervisors and Appointer Persons Slinger and Signallers Wood Occupations: <ul style="list-style-type: none"> <li>• Site Carpenter</li> <li>• Formworkers</li> </ul> Steel fixers CAD technicians Construction Engineers Project Managers
<b>Mechanical, Electrical and HVAC</b>	Welding Operatives Pipe Fitters Mechanical Fitters Approved Electricians Cable Installers HVAC Operatives Thermal Installation Operatives Specialist Coatings Operatives General Operatives

Taking this approach, it is possible to map back to the CITB categories, include established ratios for Managerial, Professional and Office Based roles (as well as related non-construction occupations) and to align the data for the purposes of this report to provide a clearer view. However, this does not consider design differences that might impact construction processes such as off-site fabrication, manufacture, and assembly. The Nuclear Advanced Manufacturing Centre opened a 'modular construction methods' manufacturing facility in Birkenhead, with a view to supporting the construction of Wylfa nuclear power station in North Wales. Similarly, with the advent of the MEH alliance for the Hinkley Point C project, Somerset County Council is exploring the potential for an MEH factory close to site. It is therefore recommended that this analysis be updated as more detailed skills planning for the project becomes available.

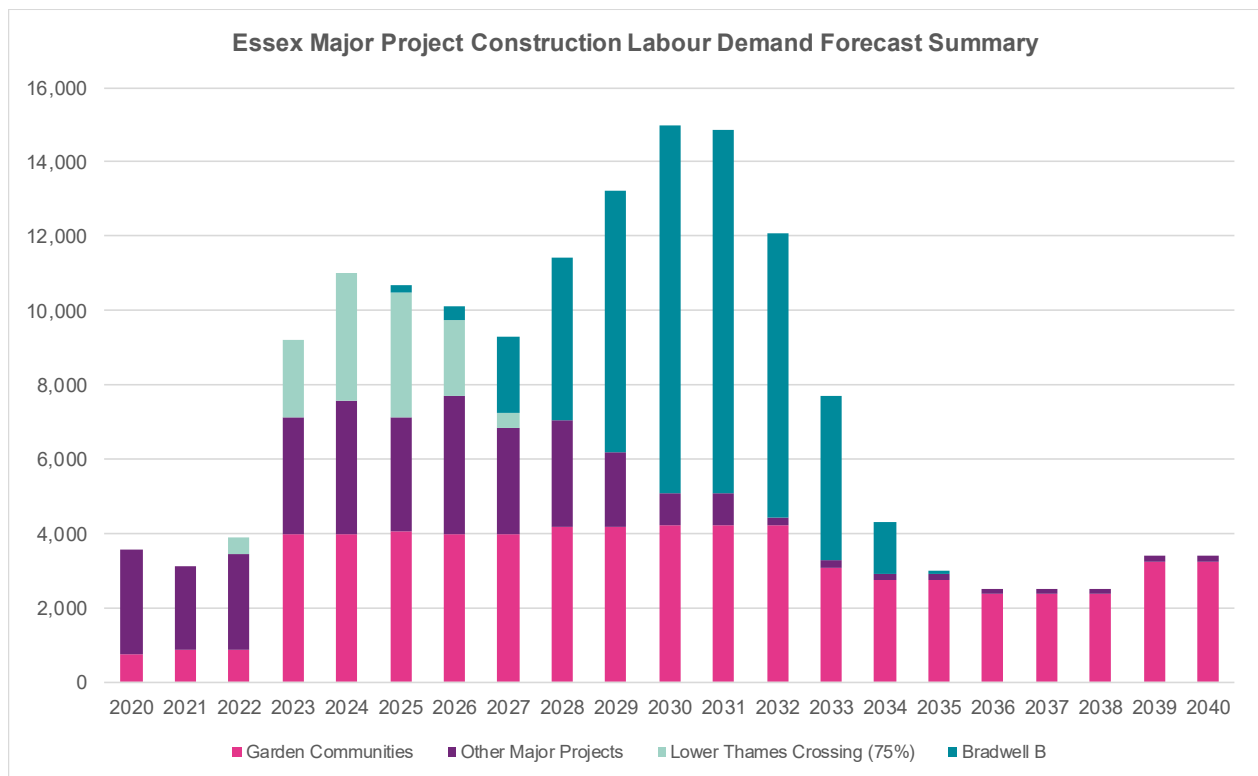
It is estimated that BRB will have a peak labour demand of around 9,800 – slightly lower than the peak estimate of 10,600 published by CGN/EDF in the Bradwell B Stage One Consultation document (which is based on a month-by-month profile and includes operational staff). As stated above, the precise skills requirements associated with BRB are still to be determined, but initial estimates suggest that

around 74% of labour demand will be for Skilled Trades and Manual roles (including some non-construction roles such as site services, security etc.). As with the estimate for LTC, it will be important to update this forecasting as project-specific details emerge.

### Summary of Major Projects Labour Demand

Figure 4.8 summarises total estimated labour demand from the major projects identified. At peak in 2030, the major projects identified are expected to boost labour demand by around 15,000. This represents a significant uplift, though it is likely that in the case of BRB and LTC in particular that a significant portion of this demand will be absorbed by non-home based workers. An allowance for this has been made within the supply side of this assessment.

**Figure 4.8: Labour Demand Summary**



Source: CITB LFT, Mace modelling

Table 4.1 below breaks down the forecast into the 28 CITB occupation groups, which are built up from Standard Occupational Classification (SOC) codes. This analysis demonstrates strong demand for 'Non-construction Professional, Managerial IT and other office-based staff' for most of the assessment period, alongside sustained demand for 'Other construction professionals and technical staff', 'Wood trades and interior fit-out' and 'Bricklayers'. Significant peaks in demand are also observed for 'Electrical trades and installation', 'Plumbing and HVAC trades', 'Plant Mechanics/Fitters', 'Plant Operatives', 'Steel erectors/structural fabrication', 'Scaffolders' and 'Civil Engineering Operatives'.

## Supply and Demand Assessment

**Table 4.1: Forecast Demand (Major Projects only)**

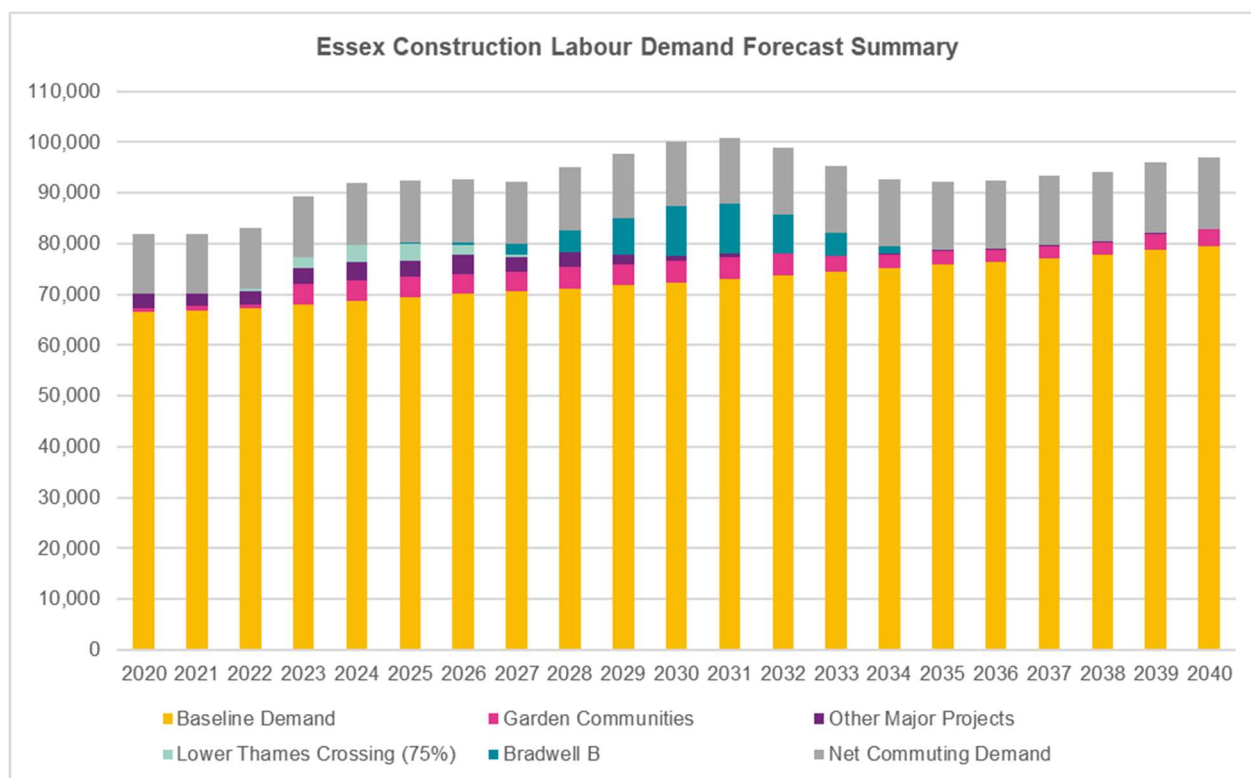
MANAGERIAL, PROFESSIONAL AND OFFICE BASED ROLES	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Other construction professionals and technical staff	300	300	400	950	1,150	1,100	1,000	800	800	750	750	750	650	450	350	350	300	300	300	350	350
Other construction process managers	250	250	300	550	650	650	600	450	450	400	300	300	250	200	150	150	150	150	150	200	200
Senior, executive, and business process managers	250	200	200	450	500	500	500	400	400	350	300	300	300	200	200	200	150	150	150	200	200
Surveyors	100	100	150	250	300	300	250	250	250	300	300	300	250	150	100	100	100	100	100	100	100
Construction Project Managers	100	50	100	150	250	250	200	100	150	150	200	200	150	100	50	0	0	0	0	50	50
Civil engineers	200	100	200	500	650	600	550	350	350	350	300	300	250	150	50	50	50	50	50	50	50
Construction Trades Supervisors	100	50	100	250	350	300	300	200	200	200	200	200	150	100	50	0	0	0	0	50	50
Architects	100	50	50	150	150	150	150	150	150	150	150	150	150	100	100	100	100	100	100	100	100
Non-construction professional, technical, IT, and other office-based staff	450	400	500	1,100	1,250	1,200	1,200	1,100	1,250	1,300	1,350	1,350	1,100	750	500	400	350	350	350	450	450
Non-construction operatives	50	50	50	100	150	150	150	300	550	800	1,100	1,100	850	500	200	50	50	50	50	50	50
<b>TOTAL MANAGERIAL, PROFESSIONAL AND OFFICE-BASED ROLES</b>	<b>1,900</b>	<b>1,550</b>	<b>2,050</b>	<b>4,450</b>	<b>5,400</b>	<b>5,200</b>	<b>4,900</b>	<b>4,100</b>	<b>4,550</b>	<b>4,750</b>	<b>4,950</b>	<b>4,950</b>	<b>4,100</b>	<b>2,700</b>	<b>1,750</b>	<b>1,400</b>	<b>1,250</b>	<b>1,250</b>	<b>1,250</b>	<b>1,600</b>	<b>1,600</b>
<b>SKILLED TRADES</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>
Wood trades and interior fit-out	350	250	250	500	600	600	550	500	600	650	700	700	550	400	250	200	200	200	200	250	250
Electrical trades and installation	100	150	150	300	350	350	350	500	750	1,050	1,400	1,350	1,050	650	250	100	100	100	100	100	100
Plumbing and HVAC Trades	100	150	150	350	400	400	400	550	800	1,100	1,400	1,400	1,100	700	350	200	150	150	150	200	200
Labourers nec*	250	200	300	850	1,100	1,050	1,000	900	1,150	1,450	1,650	1,600	1,300	800	400	200	150	150	150	250	250
Building envelope specialists	150	100	150	350	400	400	400	350	300	300	300	300	300	200	200	200	150	150	150	200	200
Painters and decorators	50	50	50	200	200	200	200	200	200	200	150	150	150	100	100	100	100	100	150	150	150
Specialist building operatives nec*	100	50	100	250	250	250	250	200	200	200	200	200	150	100	100	100	50	50	50	100	100
Bricklayers	150	100	100	400	450	450	400	400	400	400	400	400	400	300	250	250	200	200	200	300	300
Roofers	0	50	50	100	100	100	100	100	100	100	100	100	50	50	50	50	50	50	50	50	50
Plasterers	0	50	50	100	100	100	100	100	100	100	100	100	50	50	50	50	50	50	50	50	50
Plant mechanics/fitters	50	50	100	150	150	150	150	150	250	300	350	350	300	150	100	50	50	50	50	50	50
Plant operatives	100	100	150	450	650	600	500	450	700	950	1,200	1,200	950	550	200	50	50	50	50	50	50
Glaziers	0	0	0	50	50	50	50	50	50	50	50	50	50	50	50	50	0	0	0	50	50
Floorers	0	0	0	50	50	50	50	50	50	50	50	50	50	0	0	0	0	0	0	50	50
Logistics	50	50	50	100	100	100	100	50	50	50	0	0	0	0	0	0	0	0	0	0	0
Steel erectors/structural fabrication	50	50	50	100	100	100	100	200	300	450	550	550	450	300	100	50	50	50	50	50	50
Scaffolders	50	50	50	50	100	100	100	150	250	400	500	500	400	250	100	0	0	0	0	50	50
Civil engineering operatives nec*	100	100	150	350	500	450	450	450	600	800	950	900	700	450	150	0	0	0	0	0	0
<b>TOTAL SKILLED TRADES</b>	<b>1,650</b>	<b>1,550</b>	<b>1,900</b>	<b>4,700</b>	<b>5,650</b>	<b>5,500</b>	<b>5,250</b>	<b>5,350</b>	<b>6,850</b>	<b>8,600</b>	<b>10,050</b>	<b>9,900</b>	<b>8,000</b>	<b>5,100</b>	<b>2,700</b>	<b>1,650</b>	<b>1,350</b>	<b>1,350</b>	<b>1,350</b>	<b>1,950</b>	<b>1,950</b>

Source: CITB/WLC, Mace modelling.

Rounded to nearest 10.

Figure 4.9 places the additional demand associated with the major projects in the context of baseline demand and out-commuting (i.e. demand from outside Essex). These projects result in a peak demand in 2031 of 100,800 – an increase of 18,200 on base year demand (or 23%). On completion of LTC and BRB, and in the absence of a longer-term pipeline of other major infrastructure projects (such as further highways improvements), demand recedes from this peak level, though underlying growth in baseline demand means that, at aggregate level, demand in 2040 is forecast at 96,900 – a decline of c.3,000 from peak, but an increase of c.15,000 (17%) on the base year.

**Figure 4.9: Summary of Forecast Demand**



Source: CITB/WLC, CITB CSN, ONS, Mace modelling

Table 4.2 overleaf summarises total aggregate demand (including the baseline, out-commuters and major projects) in each year of the forecast by occupation. Though many of the occupations with the highest levels of demand are in the 'Managerial, Professional and Office-based Roles' category, demand remains strong for many traditional skilled trades, including 'Wood Trades and interior fit-out', 'Electrical trades and installation', and 'Plumbing and HVAC trades'. Demand from major projects is also likely to see the demand for 'Civil Engineering Operatives' more than treble from the base year.

## Supply and Demand Assessment

**Table 4.1: Overall Summary of Labour Demand by Occupation and Year**

MANAGERIAL, PROFESSIONAL AND OFFICE BASED ROLES	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Other construction professionals and technical staff	4,650	4,800	4,950	5,650	5,950	6,050	6,100	6,000	6,150	6,200	6,300	6,450	6,500	6,450	6,500	6,600	6,700	6,850	7,000	7,250	7,400
Other construction process managers	6,150	6,200	6,350	6,750	7,000	7,050	7,150	7,100	7,250	7,250	7,300	7,450	7,500	7,600	7,700	7,800	7,950	8,050	8,200	8,400	8,550
Senior, executive, and business process managers	5,400	5,350	5,450	5,750	5,900	5,950	6,000	6,000	6,050	6,050	6,100	6,150	6,200	6,200	6,250	6,300	6,350	6,450	6,550	6,650	6,750
Surveyors	1,750	1,800	1,850	2,050	2,100	2,150	2,200	2,200	2,250	2,350	2,400	2,450	2,450	2,400	2,400	2,450	2,500	2,550	2,600	2,700	2,750
Construction Project Managers	1,600	1,600	1,650	1,750	1,850	1,900	1,850	1,850	1,900	1,950	2,000	2,050	2,000	2,000	1,950	2,000	2,000	2,050	2,100	2,150	2,150
Civil engineers	1,700	1,650	1,750	2,100	2,300	2,250	2,250	2,100	2,150	2,150	2,100	2,150	2,150	2,100	2,050	2,100	2,100	2,150	2,200	2,250	2,300
Construction Trades Supervisors	1,750	1,700	1,800	1,950	2,100	2,100	2,100	2,000	2,050	2,100	2,100	2,150	2,100	2,100	2,050	2,100	2,100	2,150	2,200	2,200	2,250
Architects	1,100	1,100	1,100	1,250	1,300	1,350	1,350	1,350	1,400	1,450	1,500	1,550	1,550	1,550	1,600	1,650	1,650	1,700	1,750	1,800	1,850
Non-construction professional, technical, IT, and other office-based staff	10,950	11,050	11,250	12,050	12,450	12,600	12,750	12,800	13,150	13,400	13,700	13,850	13,850	13,700	13,650	13,750	13,900	14,150	14,350	14,700	14,950
Non-construction operatives	1,050	1,050	1,100	1,200	1,200	1,250	1,300	1,450	1,700	2,000	2,300	2,300	2,100	1,750	1,450	1,350	1,350	1,400	1,400	1,450	1,450
<b>TOTAL MANAGERIAL, PROFESSIONAL AND OFFICE-BASED ROLES</b>	<b>36,100</b>	<b>36,300</b>	<b>37,250</b>	<b>40,500</b>	<b>42,150</b>	<b>42,650</b>	<b>43,050</b>	<b>42,850</b>	<b>44,050</b>	<b>44,900</b>	<b>45,800</b>	<b>46,550</b>	<b>46,400</b>	<b>45,850</b>	<b>45,600</b>	<b>46,100</b>	<b>46,600</b>	<b>47,500</b>	<b>48,350</b>	<b>49,550</b>	<b>50,400</b>
SKILLED TRADES	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Wood trades and interior fit-out	8,150	8,050	8,050	8,350	8,450	8,500	8,450	8,350	8,450	8,500	8,550	8,600	8,450	8,300	8,150	8,100	8,100	8,100	8,100	8,150	8,200
Electrical trades and installation	6,350	6,300	6,300	6,400	6,400	6,400	6,350	6,450	6,700	6,900	7,200	7,150	6,800	6,350	5,900	5,700	5,650	5,600	5,550	5,550	5,500
Plumbing and HVAC Trades	4,950	4,950	4,900	5,150	5,200	5,200	5,200	5,300	5,550	5,850	6,150	6,150	5,850	5,400	5,050	4,900	4,850	4,850	4,850	4,900	4,900
Labourers nec*	4,550	4,500	4,650	5,250	5,500	5,500	5,500	5,450	5,750	6,100	6,350	6,350	6,100	5,650	5,300	5,150	5,150	5,200	5,250	5,400	5,450
Building envelope specialists	2,950	2,900	2,900	3,150	3,150	3,150	3,150	3,100	3,100	3,050	3,050	3,050	3,000	2,900	2,900	2,900	2,850	2,850	2,850	2,850	2,850
Painters and decorators	4,050	4,050	4,050	4,200	4,200	4,200	4,200	4,200	4,250	4,250	4,250	4,250	4,200	4,200	4,200	4,200	4,150	4,200	4,200	4,250	4,250
Specialist building operatives nec*	2,050	2,050	2,050	2,200	2,200	2,200	2,200	2,100	2,150	2,100	2,100	2,100	2,050	2,000	1,950	1,950	1,900	1,900	1,900	1,900	1,900
Bricklayers	1,900	1,850	1,850	2,150	2,200	2,200	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,050	2,000	2,050	2,000	2,000	2,000	2,050	2,050
Roofers	1,650	1,650	1,650	1,700	1,700	1,700	1,700	1,700	1,700	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,600	1,600	1,600	1,650	1,650
Plasterers	1,700	1,700	1,650	1,700	1,700	1,700	1,700	1,650	1,650	1,650	1,650	1,600	1,600	1,550	1,550	1,550	1,500	1,500	1,500	1,500	1,450
Plant mechanics/fitters	1,150	1,150	1,150	1,250	1,250	1,250	1,250	1,250	1,300	1,350	1,400	1,400	1,300	1,200	1,100	1,050	1,050	1,050	1,050	1,050	1,050
Plant operatives	1,300	1,300	1,400	1,700	1,900	1,900	1,800	1,750	2,000	2,300	2,600	2,600	2,350	2,000	1,650	1,500	1,500	1,550	1,550	1,600	1,650
Glaziers	1,100	1,100	1,100	1,150	1,150	1,150	1,150	1,150	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,050	1,050	1,050	1,100	1,100
Floorers	1,000	1,000	950	1,000	1,000	1,000	1,000	1,000	950	950	950	950	950	950	950	900	900	900	900	900	900
Logistics	750	750	800	850	850	850	900	850	850	850	850	850	850	900	900	900	900	950	950	950	1,000
Steel erectors/structural fabrication	600	600	600	650	650	650	650	700	850	950	1,100	1,100	1,000	800	650	600	600	600	600	600	600
Scaffolders	900	850	900	950	950	1,000	1,000	1,050	1,200	1,350	1,500	1,500	1,400	1,250	1,100	1,050	1,100	1,100	1,100	1,150	1,150
Civil engineering operatives nec*	800	800	900	1,100	1,250	1,200	1,250	1,200	1,400	1,600	1,750	1,750	1,550	1,250	1,000	850	850	900	900	900	900
<b>TOTAL SKILLED TRADES</b>	<b>45,900</b>	<b>45,550</b>	<b>45,850</b>	<b>48,900</b>	<b>49,700</b>	<b>49,750</b>	<b>49,600</b>	<b>49,400</b>	<b>51,100</b>	<b>52,650</b>	<b>54,350</b>	<b>54,300</b>	<b>52,350</b>	<b>49,500</b>	<b>47,100</b>	<b>46,100</b>	<b>45,700</b>	<b>45,900</b>	<b>45,900</b>	<b>46,450</b>	<b>46,550</b>

Source: CITB/WLC, Mace Modelling

Rounded to nearest 50.

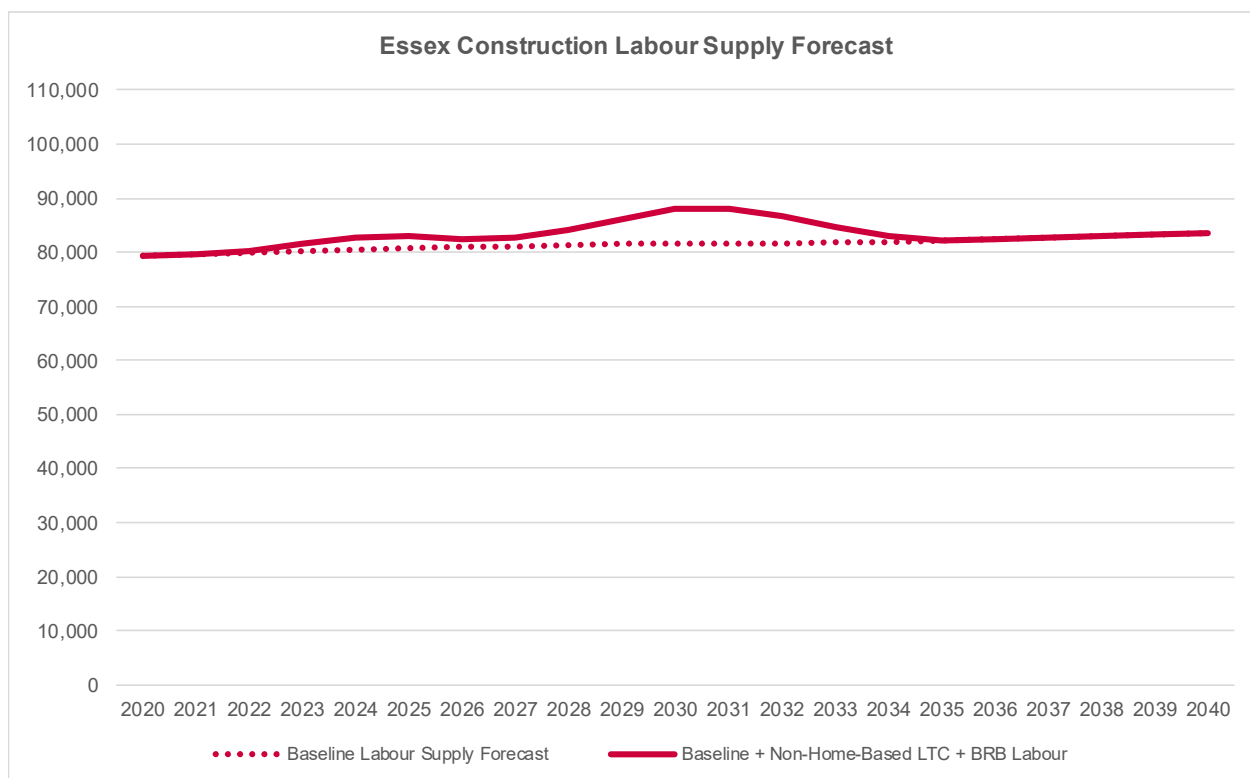
### 4.3 Projected Labour Supply

Having identified the potential scale of demand (both baseline and additional - as a result of major projects), it is now necessary to estimate the likely supply of construction labour that can be expected to be available over the course of the assessment period.

It has been estimated that construction labour supply will grow in line with the EEFM forecast growth in the working age population of Essex. Above baseline growth, it has been assumed that the two largest projects identified (LTC and BRB) will make use of significant numbers of Non-Home Based (NHB) workers. At Hinkley Point C nuclear new build in Somerset, the NHB proportion of total workers is targeted at 66%, while Sizewell C aims for 64%. As such, it has been estimated that NHB labour at BRB and LTC will account for 65% of the workforce, leaving 35% to be sourced locally (Home-based workers). This broadly aligns with the Bradwell B Stage One consultation statement that around 3,000 workers will be drawn from the local area. These NHB workers have been added to the overall supply of labour within this assessment.

Figure 4.12 below summarises the anticipated growth of the labour supply over the course of the assessment period.

**Figure 4.12: Construction Labour Supply Forecast**



Source: CITB CSN, Mace modelling

Further to this, data from CITB CSN has been used to estimate the future labour supply by occupation. This is summarised in Table 4.3 overleaf.

## Supply and Demand Assessment

**Table 4.3: Overall Summary of Labour Supply by Occupation and Year (inc. expected NHB workers at LTC and BRB) - Rounded to nearest 50.**

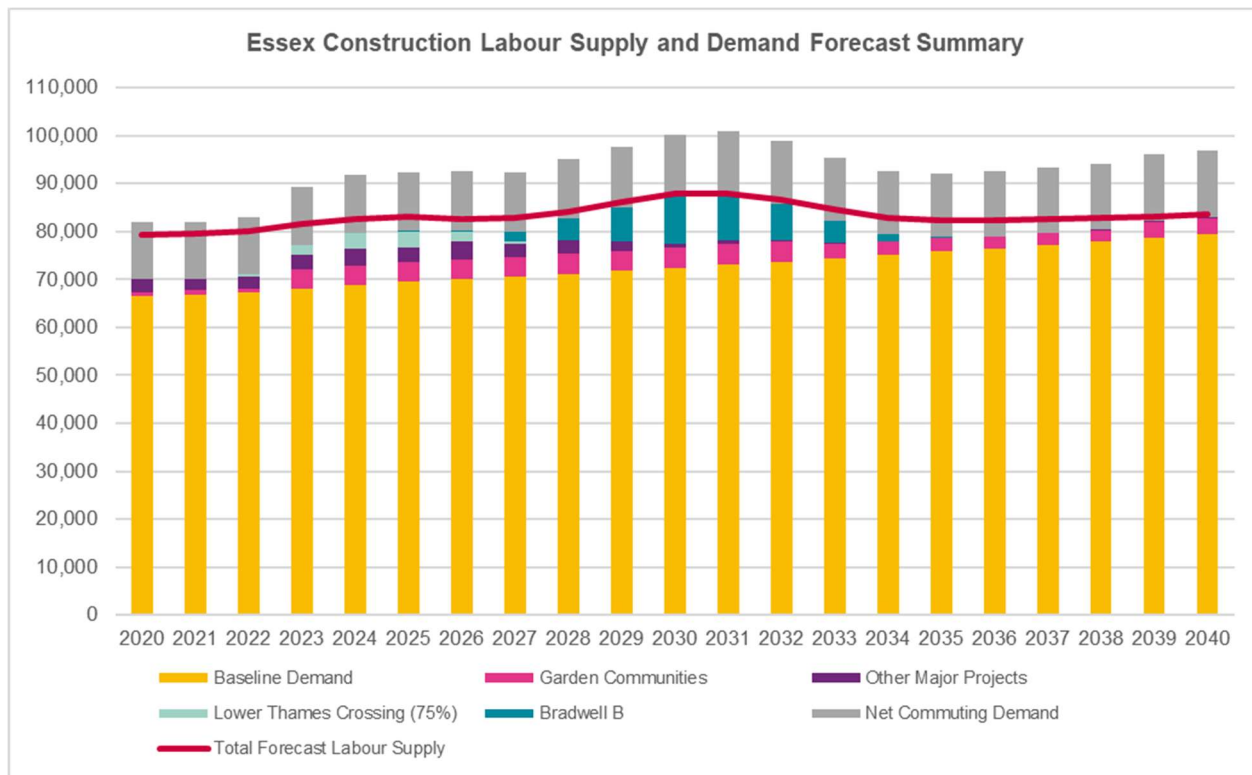
MANAGERIAL, PROFESSIONAL AND OFFICE BASED ROLES	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Other construction professionals and technical staff	4,400	4,500	4,650	4,850	5,000	5,100	5,100	5,100	5,200	5,350	5,450	5,550	5,600	5,650	5,700	5,750	5,850	5,950	6,050	6,150	6,250
Other construction process managers	5,950	6,050	6,150	6,250	6,400	6,450	6,500	6,500	6,550	6,650	6,700	6,750	6,850	6,900	6,950	7,050	7,100	7,200	7,300	7,350	7,450
Senior, executive, and business process managers	5,200	5,250	5,300	5,350	5,400	5,400	5,450	5,450	5,500	5,500	5,550	5,550	5,550	5,600	5,650	5,650	5,700	5,700	5,750	5,800	5,850
Surveyors	1,650	1,700	1,750	1,800	1,850	1,850	1,900	1,950	2,000	2,050	2,100	2,100	2,150	2,150	2,150	2,150	2,200	2,250	2,250	2,300	2,350
Construction Project Managers	1,550	1,550	1,600	1,650	1,700	1,750	1,700	1,700	1,750	1,800	1,800	1,850	1,850	1,800	1,800	1,800	1,800	1,850	1,850	1,900	1,900
Civil engineers	1,500	1,550	1,600	1,750	1,850	1,900	1,800	1,750	1,750	1,850	1,900	1,900	1,900	1,900	1,850	1,900	1,900	1,950	1,950	2,000	2,000
Construction Trades Supervisors	1,650	1,650	1,700	1,800	1,850	1,900	1,850	1,800	1,850	1,900	1,900	1,950	1,950	1,900	1,900	1,900	1,900	1,950	1,950	1,950	2,000
Architects	1,000	1,050	1,050	1,100	1,100	1,150	1,150	1,200	1,250	1,250	1,300	1,300	1,350	1,350	1,400	1,400	1,450	1,450	1,500	1,550	1,550
Non-construction professional, technical, IT, and other office-based staff	10,600	10,700	10,850	11,050	11,250	11,400	11,450	11,550	11,750	12,000	12,200	12,300	12,300	12,300	12,250	12,300	12,400	12,550	12,650	12,800	12,950
Non-construction operatives	1,050	1,050	1,050	1,100	1,100	1,150	1,150	1,250	1,450	1,650	1,850	1,850	1,700	1,500	1,300	1,200	1,200	1,250	1,250	1,250	1,300
<b>TOTAL MANAGERIAL, PROFESSIONAL AND OFFICE-BASED ROLES</b>	<b>34,550</b>	<b>35,050</b>	<b>35,700</b>	<b>36,700</b>	<b>37,500</b>	<b>38,050</b>	<b>38,050</b>	<b>38,250</b>	<b>39,050</b>	<b>40,000</b>	<b>40,750</b>	<b>41,100</b>	<b>41,200</b>	<b>41,050</b>	<b>40,950</b>	<b>41,100</b>	<b>41,500</b>	<b>42,100</b>	<b>42,500</b>	<b>43,050</b>	<b>43,600</b>
<b>SKILLED TRADES</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>	<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>
Wood trades and interior fit-out	7,950	7,900	7,850	7,850	7,850	7,850	7,750	7,750	7,750	7,750	7,750	7,700	7,600	7,500	7,350	7,300	7,250	7,200	7,150	7,150	7,100
Electrical trades and installation	6,300	6,250	6,200	6,150	6,100	6,000	5,950	6,000	6,100	6,200	6,350	6,250	6,000	5,700	5,400	5,200	5,100	5,050	4,950	4,900	4,850
Plumbing and HVAC Trades	4,900	4,850	4,850	4,800	4,800	4,750	4,750	4,800	4,950	5,100	5,250	5,200	5,000	4,750	4,500	4,350	4,300	4,300	4,250	4,200	4,200
Labourers nec*	4,350	4,350	4,400	4,600	4,750	4,800	4,700	4,700	4,850	5,100	5,350	5,350	5,150	4,900	4,650	4,550	4,550	4,600	4,600	4,650	4,650
Building envelope specialists	2,850	2,850	2,800	2,800	2,800	2,800	2,750	2,700	2,700	2,650	2,650	2,600	2,600	2,550	2,550	2,500	2,500	2,450	2,450	2,400	2,400
Painters and decorators	4,050	4,050	4,050	4,050	4,000	4,000	4,000	3,950	3,950	3,900	3,900	3,850	3,850	3,800	3,800	3,750	3,750	3,700	3,700	3,700	3,700
Specialist building operatives nec*	2,000	2,000	2,000	2,000	2,000	2,000	1,950	1,900	1,900	1,900	1,850	1,850	1,800	1,800	1,750	1,700	1,700	1,650	1,650	1,650	1,600
Bricklayers	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,750	1,700	1,700	1,700	1,700	1,650	1,650	1,650	1,650	1,650	1,650	1,600	1,600	1,600
Roofers	1,650	1,650	1,600	1,600	1,600	1,600	1,600	1,550	1,550	1,550	1,550	1,500	1,500	1,500	1,450	1,450	1,450	1,450	1,450	1,400	1,400
Plasterers	1,700	1,700	1,650	1,650	1,600	1,600	1,600	1,550	1,550	1,500	1,500	1,450	1,450	1,400	1,400	1,400	1,350	1,350	1,300	1,300	1,250
Plant mechanics/fitters	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,150	1,200	1,200	1,150	1,050	1,000	950	950	900	900	900	900
Plant operatives	1,200	1,200	1,250	1,400	1,550	1,550	1,500	1,450	1,650	1,850	2,050	2,050	1,900	1,650	1,450	1,350	1,350	1,400	1,400	1,400	1,400
Glaziers	1,100	1,100	1,100	1,100	1,050	1,050	1,050	1,050	1,050	1,050	1,000	1,000	1,000	1,000	1,000	950	950	950	950	950	950
Floorers	1,000	950	950	950	950	950	950	900	900	900	900	900	850	850	850	850	850	800	800	800	800
Logistics	700	700	750	750	800	800	800	800	800	800	800	800	800	800	800	850	850	850	850	850	850
Steel erectors/structural fabrication	550	550	550	550	550	550	550	600	700	750	850	850	800	650	550	500	500	500	500	500	500
Scaffolders	850	850	850	900	900	900	900	950	1,050	1,150	1,250	1,250	1,200	1,100	1,000	950	950	1,000	1,000	1,000	1,000
Civil engineering operatives nec*	700	700	750	850	950	950	900	900	1,000	1,200	1,350	1,350	1,250	1,050	850	800	800	800	800	800	800
<b>TOTAL SKILLED TRADES</b>	<b>44,700</b>	<b>44,500</b>	<b>44,450</b>	<b>44,850</b>	<b>45,100</b>	<b>45,000</b>	<b>44,550</b>	<b>44,400</b>	<b>45,250</b>	<b>46,200</b>	<b>47,250</b>	<b>46,850</b>	<b>45,550</b>	<b>43,700</b>	<b>42,000</b>	<b>41,050</b>	<b>40,800</b>	<b>40,600</b>	<b>40,300</b>	<b>40,150</b>	<b>39,950</b>

Source: CITB/WLC, Mace Modelling

## 4.4 Gap Analysis

Having estimated both demand for and supply of labour over the course of the assessment period, it is possible to compare the two analyses to identify potential gaps in the provision of workforce and skills required to deliver both baseline 'business as usual' growth and additional demand from major projects. Figure 4.13 below compares the components of demand against forecast supply (including an allowance for NHB workers at LTC and BRB).

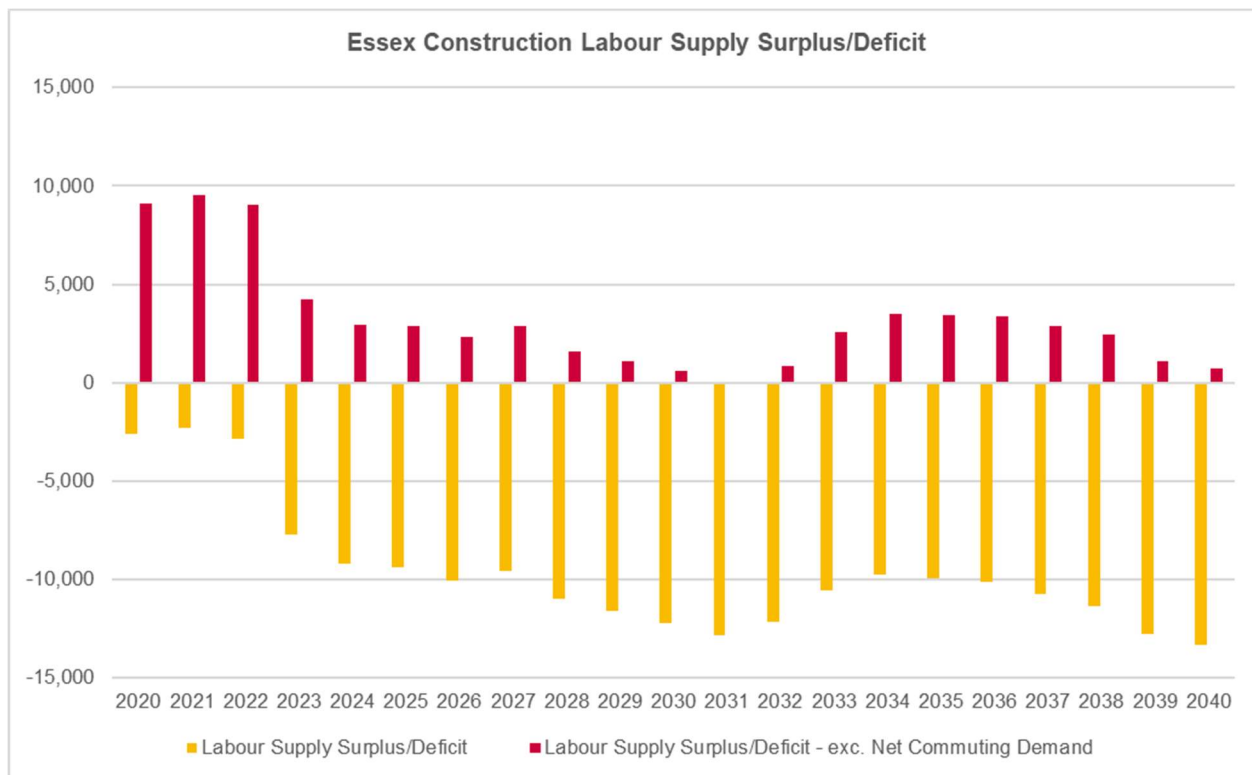
**Figure 4.13: Supply and Demand comparison**



Source: CITB/WLC, CITB CSN, Mace modelling

As demonstrated above, forecast growth in the supply of construction labour is not expected to be sufficient to meet forecast demand in its entirety. Figure 4.14 summarises the scale of this deficit, both including and excluding external demand.



**Figure 4.14: Labour Surplus/Deficit by Year**

Source: CITB/WLC, CITB CSN, Mace modelling

At the aggregate level, reducing the number of people commuting out of Essex for work in the construction industry would accommodate the full extent of demand from Essex projects and baseline in all but three years. Achieving this in practice, however, is likely to be difficult, given that wages are significantly higher in the capital and demand shows no sign of abating.

Table 4.4 overleaf summarises the gap between supply and demand at occupation level. Please note that figures in this table may not sum to the difference between figures reported in Tables 4.2 and 4.3 due to rounding.

## Supply and Demand Assessment

**Table 4.3: Forecast Surplus/Deficit of Labour Supply by Occupation**

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Other construction professionals and technical staff	-250	-250	-300	-850	-950	-950	-1,000	-850	-950	-900	-850	-900	-900	-800	-800	-850	-850	-900	-950	-1,100	-1,150
Other construction process managers	-200	-200	-200	-500	-600	-600	-650	-600	-650	-600	-600	-650	-650	-700	-700	-800	-800	-900	-950	-1,000	-1,100
Senior, executive, and business process managers	-200	-150	-150	-450	-500	-550	-550	-550	-550	-550	-550	-600	-650	-600	-600	-650	-700	-750	-750	-850	-900
Surveyors	-50	-100	-100	-250	-300	-300	-300	-250	-300	-300	-300	-350	-300	-250	-250	-250	-300	-300	-300	-400	-400
Construction Project Managers	-50	-50	-50	-100	-150	-150	-150	-150	-150	-150	-200	-200	-200	-150	-150	-200	-200	-200	-200	-250	-250
Civil engineers	-200	-100	-150	-350	-400	-350	-400	-350	-350	-300	-250	-250	-250	-200	-200	-200	-200	-250	-250	-300	-300
Construction Trades Supervisors	-100	-50	-100	-150	-200	-200	-250	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-250	-250	-250
Architects	-100	-50	-50	-150	-200	-200	-200	-150	-200	-200	-200	-200	-200	-200	-200	-200	-200	-250	-250	-300	-300
Non-construction professional, technical, IT, and other office-based staff	-350	-300	-350	-1,000	-1,150	-1,200	-1,300	-1,250	-1,350	-1,400	-1,450	-1,550	-1,500	-1,400	-1,400	-1,450	-1,500	-1,600	-1,700	-1,900	-2,000
Non-construction operatives	0	-50	-50	-100	-100	-100	-150	-200	-300	-350	-450	-450	-400	-300	-200	-150	-150	-150	-150	-200	-200
<b>TOTAL MANAGERIAL, PROFESSIONAL AND OFFICE-BASED ROLES</b>	<b>-1,500</b>	<b>-1,300</b>	<b>-1,500</b>	<b>-3,900</b>	<b>-4,550</b>	<b>-4,600</b>	<b>-4,950</b>	<b>-4,550</b>	<b>-5,000</b>	<b>-4,950</b>	<b>-5,050</b>	<b>-5,350</b>	<b>-5,250</b>	<b>-4,800</b>	<b>-4,700</b>	<b>-4,950</b>	<b>-5,100</b>	<b>-5,500</b>	<b>-5,750</b>	<b>-6,550</b>	<b>-6,850</b>
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Wood trades and interior fit-out	-250	-150	-150	-500	-600	-650	-650	-650	-750	-750	-800	-900	-850	-800	-800	-800	-850	-900	-950	-1,050	-1,050
Electrical trades and installation	-50	-100	-100	-250	-350	-400	-400	-450	-600	-700	-850	-900	-800	-650	-550	-500	-550	-550	-600	-650	-650
Plumbing and HVAC Trades	-50	-100	-100	-350	-400	-450	-450	-500	-600	-750	-900	-950	-850	-700	-550	-550	-550	-550	-600	-650	-700
Labourers nec*	-200	-150	-200	-650	-750	-750	-850	-800	-900	-1,000	-1,000	-1,000	-950	-750	-600	-600	-600	-650	-650	-750	-800
Building envelope specialists	-100	-100	-100	-350	-350	-400	-400	-400	-400	-400	-400	-450	-450	-350	-350	-400	-400	-400	-400	-450	-450
Painters and decorators	0	0	0	-150	-200	-250	-250	-250	-300	-350	-350	-350	-400	-400	-400	-400	-450	-450	-500	-550	-550
Specialist building operatives nec*	-50	-50	-50	-200	-200	-200	-250	-200	-250	-250	-200	-250	-250	-200	-200	-200	-200	-250	-250	-250	-250
Bricklayers	-100	-100	-100	-400	-400	-450	-400	-400	-450	-450	-450	-500	-500	-400	-350	-400	-350	-350	-400	-450	-450
Roofers	0	0	0	-100	-100	-100	-100	-100	-150	-150	-150	-150	-150	-150	-150	-150	-150	-200	-200	-200	-200
Plasterers	0	0	0	-100	-100	-100	-100	-100	-150	-150	-150	-150	-150	-150	-150	-150	-150	-150	-150	-200	-200
Plant mechanics/fitters	-50	-50	-50	-150	-150	-150	-150	-150	-200	-200	-200	-200	-200	-150	-150	-100	-100	-100	-100	-150	-150
Plant operatives	-100	-50	-100	-250	-350	-350	-350	-300	-400	-450	-550	-550	-450	-300	-200	-150	-150	-150	-150	-200	-200
Glaziers	0	0	0	-50	-50	-50	-50	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-100	-150	-150
Floorers	0	0	0	-50	-50	-50	-50	-50	-50	-50	-50	-100	-100	-50	-100	-100	-100	-100	-100	-100	-100
Logistics	0	-50	-50	-50	-100	-100	-100	-50	-100	-50	-50	-50	-50	-50	-100	-100	-100	-100	-100	-100	-100
Steel erectors/structural fabrication	-50	-50	-50	-100	-100	-100	-100	-100	-150	-200	-250	-250	-200	-150	-100	-50	-100	-100	-100	-100	-100
Scaffolders	-50	0	0	-50	-50	-50	-50	-100	-150	-200	-250	-250	-200	-150	-100	-100	-100	-100	-150	-150	-150
Civil engineering operatives nec*	-50	-100	-150	-250	-300	-250	-350	-300	-350	-400	-350	-400	-300	-200	-100	-100	-100	-100	-100	-100	-100
<b>TOTAL SKILLED TRADES AND MANUAL</b>	<b>-1,100</b>	<b>-1,050</b>	<b>-1,200</b>	<b>-4,000</b>	<b>-4,600</b>	<b>-4,850</b>	<b>-5,050</b>	<b>-5,000</b>	<b>-6,050</b>	<b>-6,600</b>	<b>-7,050</b>	<b>-7,500</b>	<b>-6,950</b>	<b>-5,700</b>	<b>-5,000</b>	<b>-4,950</b>	<b>-5,100</b>	<b>-5,300</b>	<b>-5,600</b>	<b>-6,250</b>	<b>-6,350</b>

Source: Mace modelling, CITB CSN, CITB/WLC, ONS

Note: May not sum to difference between tables 4.2 and 4.3 due to rounding

Rounded to nearest 50.

Owing to the aggregate level deficit of supply, all 28 occupations are in deficit by 2040, reflecting a critical need to boost the supply of construction labour in Essex generally. However, additional demands associated with major projects create a number of particularly acute shortages. The growing need for 'Non-construction Professional, Managerial IT and other office-based staff' and 'Wood trades and interior fit-out' results in significant deficits growing in these occupations over time, whilst peaks of demand described in section 4.2 above result in acute shortages of 'Electrical trades and installation', 'Plumbing and HVAC trades', 'Labourers', 'Plant Operatives' and 'Civil Engineering Operatives'.

## 5. Key Issues and Disruptors in the Construction Industry

The supply and demand assessment summarised in the previous Chapter is predicated on a continuation of ‘business as usual’ in the construction sector. However, the industry is going through a period of accelerated change, in response to both direct and indirect factors, which have the potential to alter supply and demand dynamics over the course of the assessment period. This chapter reviews the key issues and disruptors affecting the construction industry and provides a number of alternative supply and demand scenarios for Essex based on potential outcomes of disruptive change.

### 5.1 Skills Decay and Ageing Workforce

The ONS reported in 2018 looked at the composition of the overall construction contracting labour market in the UK. The report shows how the construction workforce, in England and Wales, aged significantly between 1991 and 2011<sup>12</sup>:

- Construction workers from the 1991 Census have the youngest age profile; 43% of the workforce were aged between 16 and 34, this declined to 33% in the 2001 Census and then 31% in the 2011 Census.
- The 2011 Census shows more workers aged over 45 than previous censuses (45%), which is higher than in 1991 (32%).
- Of the construction workers from the 1991 Census who were present in the 2011 Census, approximately 26% had retired (compared to 32% who retired in this time frame in all other industries).
- The construction workforce is ageing, there was a 13% increase in the numbers of workers aged 45 years and over in the construction industry between 1991 and 2011,
- Non-UK nationals are younger (18% aged 45 years and older) compared to UK nationals (47% aged 45 years and older).

This analysis goes on to explain that the construction sector is very flexible but fragmented, which contributes to the intrinsic difficulties when gathering data.

This is further explored in a CITB commissioned report<sup>13</sup> highlighting that the sector has an ageing profile, has a lower number of over 50-year olds in its workforce than in the population – indicating that the over 50s tend to leave the sector in disproportionate numbers - and defines the nature of the skills decay. The report concludes:

- Between 2014 and 2018 the number of 16-19-year olds in the sector halved whilst the number of over 50-year olds increased by over 5%.
- Compared to national averages the sector has low proportions of worker in every age group except the oldest.
- The issue is at its most acute in the crucial 16-24 category.
- By the end of 2017 c.47% of the sector was aged over 45.
- Those aged under 45 were dominated by non-UK-born workers.

Issues relating to an ageing workforce are also manifest in the engineering construction sector. In 2017 it was widely reported that the average age of a UK welder was 55, whilst this is not specific to welding for construction, ECITB identify the ageing issue specifically in their 2020 Strategy<sup>14</sup>; ECITB identify ‘Demographic Change’ as one of four main drivers underpinning their strategy and is supported by

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<sup>12</sup> Migrant labour force within the construction industry: June 2018 - ONS

<sup>13</sup> CITB Report, Fuller Working Lives in Construction – Pye Tait (2018)

<sup>14</sup> Leading Industry Learning, Strategy:2020 - 2022 – ECITB 2020

ECITB data that predicts just under one fifth of the entire engineering work force will be retired, or close to retired by 2026:

- 14% of the Engineering Construction Industry workforce are set to retire by 2026.
- Professions such as mechanical engineers, metal workers, estimators, assessors, pipe-fitters, and electronic trades as well as managerial and project management roles on construction sites could see between a quarter and a third of their workforce retire in the next 10 years<sup>15</sup>.
- The industry needs to attract more young talent into engineering construction to plug the gap.
- Annual losses from retirement outpace the sectors ability to attract new entrants.

The ONS, CITB and ECITB data does not break down by county or region, but, based on the Essex demographic and the analysis of the sector, it is possible to conclude that Essex will not differ significantly, and any difference is likely to see the trend towards increased levels of ageing in the workforce being exacerbated.

## 5.2 Labour Shortages and Migration Policy

As outlined above, labour shortages in the construction sector are a national phenomenon. The CITB CSN forecasts that the sector will have to fill 168,500 jobs between 2019 and 2023. With growth rates of 1.1% that would see a requirement for 410,000 additional workers nationally by 2030. To meet current demand a small but significant proportion of the labour force is foreign born, representing over 14% of the labour force, with 9% of the total coming from the European Economic Area. The reliance on EEA workers is particularly significant in London, where just under 50% of construction workers come from the EEA<sup>16</sup>. EEA-born construction workers are represented across all construction occupations and at all levels, however in London the proportion of those in elementary trades rises to slightly over half (52%).

In February 2020 the UK Government announced a new 'skills-based' immigration system which will see free movement for EU nationals end in 2021. The new policy combines a number of skills and salary thresholds which include a 'headline' salary threshold of £25,600. The policy acknowledges that, in order to respond to the new policy, employers will need to become less reliant on the immigration system and place more emphasis on productivity, staff retention and investment in technology and automation.

In 2018, the GLA undertook an analysis based on the proposal in the government white paper of a £30,000 minimum threshold<sup>17</sup>. It found that in London in 'Construction and building trades' 24,900 jobs paid less than the threshold and were held by European Economic Area (EEA) workers, the most impacted of any sector. Using an alternative scenario based on a £21,000 threshold the number of EEA-held jobs impacted reduced to 11,800.

The relationship between immigration and the labour market is complex. The Government has acknowledged the potential for temporary work visas in the future and indeed according the Migration Observatory<sup>18</sup>, of non-EU citizens, 25% of those receiving their first visa were paid under the threshold. This suggests that historically there has been an element of flexibility in the Government approach to labour shortages through temporary work visas.

Alongside the salary cap, it is proposed that the cap on non-EU skilled workers with a job offer will be removed. There are two potential positive impacts in terms of labour migration. Firstly, the removal of

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<sup>15</sup> Engineering Today – The Supply and Demand for Engineers in the UK – ECITB 2018

<sup>16</sup> Potential impacts of immigration policies based on skills and salary thresholds in London, GLA 2018

<sup>17</sup> Potential impacts of immigration policies based on skills and salary thresholds in London, GLA 2018

<sup>18</sup> <https://migrationobservatory.ox.ac.uk/resources/commentaries/threshold-which-threshold-how-many-non-eu-workers-actually-have-to-meet-the-30000-minimum-income-requirement/>

the cap for non-EU workers will potentially increase labour migration from the rest of the world and the lowering of the threshold for non-EU workers to £25,600 will broaden the range of people who will have access to the UK labour market.

This should be weighed against the increased bureaucracy implied by a visa system which may impact immigration of skilled EU workers who meet the criteria. The introduction of a visa system may dissuade skilled entrants from other EU countries from applying, where they have free access to other labour markets within the EU, whilst simultaneously opening up the UK to competition from other visa-issuing economies. Added to this is the nature of free movement in the UK, which is characterised by minimal registration requirements, as compared with other EU states, and has potentially inflated the proportion of transient EU labour in the UK.

Migration is affected by a range of factors, not just political drivers. EU net migration has fallen since the decision of the UK to leave the EU in 2016<sup>19</sup>. However, the extent to which the political decision has driven the slowdown or whether other factors such as the fall in the value of sterling against the euro have driven the change is difficult to quantify.

If national figures were applied in Essex and 9% of the construction labour force came from the EEA that would equate to 7,100 construction workers in 2020. It is important to acknowledge that this represents the 'stock' of EEA workers and the assumption would be that the current EEA labour force, for the most part, would have permission to stay. However, as identified in the GLA study, construction has faced a recent growth in reliance on EEA for labour with significant growth between 2012-17 across all skill levels. This has implications for the ability and speed at which the sector can adjust to the proposed immigration system.

Whilst the adjustment period would represent a significant challenge to the sector, the assumption is that in a 'skills-based' immigration system the market for medium/high skills roles will adjust in the medium to long-term.

However, analysis by the GLA suggests that a significant proportion of jobs in Construction and Building trades that meet the skills threshold pay less than £24,000. For the UK as a whole, for Construction and Building Trade roles, 38% earn less than £24,000, with 11% of these jobs held by workers from the EEA (for London this drops to 24% with EEA workers representing 46% of the workforce).

In terms of lower skill roles across low skilled occupation categories that do not meet the skills requirements, a significant proportion of the workforce is made up of EEA workers. The following table sets out construction occupations at a national level which do not meet the skills threshold and the scale and relative importance of EEA workforce.

	EEA workforce	EEA workforce proportion
Building finishing trades	24,300	13%
Elementary construction	25,900	19%
Construction Operatives	16,300	11%
Plant and machine operatives	24,200	21%

Any labour shortages in some sub-sectors may also have knock on impacts elsewhere, both within the construction industry but also across other industries. The dependence on low skill workers across a number of sectors such as agriculture, retail, hospitality, etc, will create greater competition for scarce labour resource.

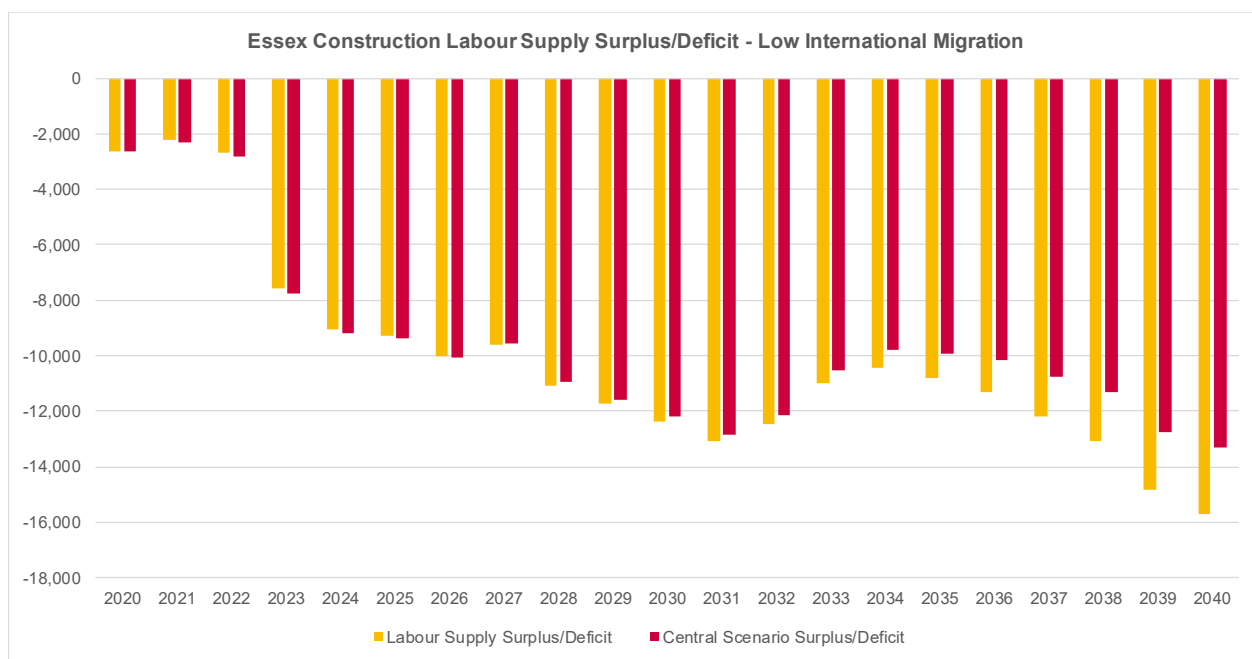
<sup>19</sup> ONS Migration Statistics Quarterly Report; Feb 2020

The impact on London with regards roles held by EEA nationals is far greater. Again, according to the GLA study, combining the skilled roles paying under £24,000 and the non-skilled construction roles would suggest that more than 45,000 current jobs would not meet the proposed 'skills-based' immigration policy. Given the interconnectedness of the Essex and London labour markets, the level of adjustment required in London is likely to impact on the Essex construction workforce.

### Impact on Labour Supply and Demand

Changes to migration policy post-Brexit are expected to result in lower rates of population growth, and therefore lower rates of working age population growth. This is due to lower numbers of migrants entering Essex directly, and also lower numbers entering indirectly. Many international migrants enter through 'gateway' locations – primarily major cities, before later moving to other parts of the country, such as Essex, for the same reasons that many UK-born people move out of urban areas (better access to housing that meets needs, more space, better access to nature etc.). To establish the potential impact of reduced migration, the ONS 2018-based Sub-National Population Projections have been consulted, which provide a 'central' scenario as well as a 'low international migration' variant. Applying a reduced rate of working age population growth to the supply side of the model results in the labour deficit growing, as shown in Figure 5.2.

**Figure 5.2: Impact of reduced international migration**



Source: CITB/WLC, Mace modelling, ONS

Under this scenario, the peak year of deficit actually shifts to the end of the assessment period, owing to a growing shortfall of labour supply.

### 5.3 Innovation and Emerging Methods in Construction

The Construction Sector Deal, published in 2018, highlighted three strategic principles for the transformation of the construction sector:

- Digital technologies
- Increased use of manufacturing
- Whole life performance

These three principles are inter-related and reinforcing. Modern Methods of Construction (MMC) is an all-encompassing term that incorporates a range of off-site manufacturing, pre-fabrication and on-site techniques which are often supported and stimulated by advances in digital technologies. Whole-life performance can be supported by digital technologies and consistency and quality driven through the manufacturing process.

MMC covers a broad range of construction activities. The focus has tended to be on the housebuilding sector where the potential for mass-production at scale is most obviously recognisable. However, it is not exclusively so, with large scale infrastructure projects like Heathrow Airport looking at MMC to support a range of objectives for the airport expansion and in Highways England where the regionalisation of frameworks is in part designed to develop a regional workforce, support mass production and reduce on-site labour intensity.

In the housebuilding sector there are two core approaches to MMC - Volumetric and Panelised.

**Volumetric** are three dimensional units that are fully fitted out before delivery to site. The units are then stacked to form dwellings. The most common form of volumetric construction is for flats where there are a large number of identical units. Volumetric units will also vary in size, with bathroom or kitchen volumetric 'pods', commonly used in student accommodation and hotels, increasingly being adopted for housebuilding.

**Panelised** systems are flat units, built in a factory environment and assembled into three dimensional structures on site. There are two main types: open panels, which can be structural and act as a 'frame' where services, cladding, insulation, etc is fitted on-site; and closed panels where elements like windows, cladding, etc, are fitted off-site.

Alongside these two main approaches there are a multiplicity of variations which will impact on how much of a dwelling is factory-built and the corresponding level of on- and off-site construction requirements. These include hybrids of volumetric and panelised systems as well as sub-assembly off-site including roof structures.

### Drivers of MMC

There are several factors driving MMC predicting that it is likely to have a growing impact on the construction sector over the coming years. MMC was highlighted in the Construction Sector Deal as part of the drive towards greater productivity. Amongst the steps identified was the presumption in favour of off-site construction for a number of Government departments by 2019, where it represented best value for money. The key drivers include:

- The **skills challenge** which is faced across the sector and is all the more challenging given the drive for greater investment in infrastructure and the UK's housing crisis
- Linked to the above is the need for greater **efficiency and productivity** to make better use of the resources available to the sector and increase capacity
- Increased emphasis on **health and safety**
- The potential to provide greater **quality**, including better whole life performance
- Improved **environmental** outcomes, including lower carbon emissions, reduced local impacts and the circular economy



- Improved information **technology**, incorporating BIM, is driving the take-up of applications across all aspects of the sector and off-site in particular
- The (re)emergence of new types of housing provision, such as social provision and private build to rent, with an emphasis on **speed** of delivery is expanding the market for MMC

### Key Barriers

There are significant barriers to off-site production, particularly as it implies a radical shift in the way the construction sector works. These include:

- Risk of capital investment in a factory site, which is exacerbated by lack of certainty on project pipeline and inability to deliver at scale
- Procurement of MMC and the lack of manufacturing capacity to deliver
- Traditional models of housing delivery in the private sector
- Lack of a secure, visible, long-term pipeline of projects
- Lack of knowledge in the sector and required change in behaviours
- Negative pre-conceptions of MMC quality from developers and final purchaser

In the housebuilding sector, the traditional model of private housebuilding does not lend itself to MMC. The sector is driven by absorption rates, where speed of delivery is not the primary goal. MMC also has implications for cashflow and to date, off-site manufacture cannot compete on cost with the highly value-engineered housebuilding model. However, as outlined above other sub-sectors of housebuilding are growing in popularity, in order to meet housing shortages.

The issue of lack of manufacturing capacity has thus far led to many developers investing in their own manufacturing facility. In Essex, for example, Swan Housing has adopted a vertically integrated approach.

A survey of leaders in the construction sector by Clyde and Co asked whether MMC<sup>20</sup> had the potential to fundamentally transform the sector, with 62% strongly agreeing. The report also asked respondents to assess the take up of MMC in the sector, with 39% suggesting that in 2018 that stood at less than 10%, whilst in 5 years' time, 39% predicted that MMC would represent between 31-40% of construction work.

The focus on Modern Methods of Construction has been on the housing sector. One exponent points to the housing sector representing the 'lowest hanging fruit', where factory methods are more easily replicable at scale. This also points to the relative immaturity of the market.

### The Heathrow expansion hub model

There are numerous examples of modern methods being adopted in non-housing schemes. Heathrow Airport Limited is promoting the development of off-site hubs to support the proposed airport expansion which (over a twenty-year timeframe) involves a third runway and additional terminal capacity.

The Appeal court decision in February 2020 regarding the legality of Heathrow expansion plans has caused a hiatus in the programme, however the plans for the utilisation of hubs to support construction are ambitious, aiming to deliver a significant proportion of construction activity off-site and reduce the peak on-site workforce.

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<sup>20</sup> Clyde and Co

In early 2019, 18 sites were shortlisted with a view to reducing these to four hubs. The types of activity that Heathrow identified for delivery by the hubs include:

- Logistics
- Consolidation, storage, security and QA
- Pre-fabrication off site
- Assembly, configuration, testing and commissioning
- Prototyping, trialling and research
- Training

Heathrow established the Heathrow Consolidation Centre in 2001 to support construction activities at Heathrow 1-4 and is still operational today. The current proposals are far more all-encompassing with the key watchword being flexibility with adaptable facilitated workspace.

### Emerging Collaborative Contracting Arrangements

In 2016, the Farmer Review<sup>21</sup> highlighted the structural fragmentation of the construction sector which resulted in a lack of collaboration and innovation. The theme was picked up in the Construction Sector Deal which highlighted the Business Environment as one of the key policy areas to deliver its three principles identified at the start of section 5.3. The major contracting industry is characterised by low margins, exacerbated by traditional transactional contract arrangements which can incentivise confrontation over innovation.

Whilst collaborative contracts (or Alliancing as it is commonly known) are not new, having been successful in a number of sectors, they are comparatively untested in construction. The approach was given impetus in the construction sector with the establishment of Project 13 by the Institution of Civil Engineers (ICE) in 2018, which is an industry-led initiative to improve the way large-scale infrastructure is delivered and managed. Alliancing covers a spectrum of collaborative arrangements, but in 'purest' form is an arrangement between the client, contractor and professional team (designers, architects, engineers) and will take the form of a bespoke contract where claims between parties are limited.

Typically, the alliancing approach will see the client and contractors having shared obligations but also the sharing of risks and opportunities. This entails a more collaborative process which promotes openness and trust and an alignment of interest which is symbolised by the development of Integrated Delivery Teams.

Heathrow Airport is a key member of the Project 13 Executive Group and the alliancing model has been a key element of the strategy for the development of the hub model and is reflected in the range of activities identified. Central to the model is a 'capable' owner – Heathrow Airport Limited - which has direct relationships with suppliers and advisors and who works with an 'integrator' to engage with all tiers of the market to develop a solution that meets the requirements of the enterprise.

Whilst the focus of Project 13 is on large-scale and complex infrastructure projects, the principles apply equally to smaller frameworks. Project 13 highlights a case study from a local highways authority. Surrey County Council (SCC) used the ICE Alliancing Code of Practice to develop a collaborative model to deliver a roads renewal programme with tier one and tier two suppliers. Key to delivery was gaining agreement for a five-year budget from SCC Cabinet which provided the long-term certainty and timeframe to develop collaborative working methods. Outcomes were clearly defined by SCC as owner of the asset and through discussion with the integrator were able to identify potential cost savings. Teams were co-located, further building trust and collaboration and providing the conditions

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<sup>21</sup> The Farmer Review of the UK Construction Model, 2016

to support innovation, waste reduction and quality. The approach generated savings of 15% on a £120m programme, improved customer satisfaction and additional apprenticeship outcomes.

Whilst alliancing is not necessary for the development of MMC, the greater degree of collaboration it entails encourages the take up of innovation and supports whole life performance both of which are intrinsic benefits of MMC. Greater emphasis on collaboration and shared risk and opportunity creates the environment for improved long-term planning and greater investment in innovation and the workforce.

### Impact on skills and the workforce

The widespread adoption of modern methods of construction and the significant role digital technologies will play in that, will have fundamental impacts on the construction workforce in terms of overall numbers, skills requirements and where that workforce will be located.

There has been considerable commentary relating to Industry 4.0, especially within the manufacturing industries. The rate of change/advance for the construction sector is hard to predict and is largely dependent upon the strategic direction clients take in terms of design; however, due to a number of barriers outlined in the previous section it is likely the sector will not undergo a dramatic paradigm shift, rather evolve and change incrementally as methods emerge and traditional construction continues.

The integration of new technologies within the sector and the introduction of innovative manufacturing and factory methodologies has already started to generate new ways of working that are having a knock-on impact on skills requirements. Feedback from stakeholders in the county aligns with national commentary:

- Operative occupations in the manufacturing setting require multiskilled capabilities,
- All levels require digital upskilling – BIM and associated digital technologies becoming more mainstream and driven through policy and delivery processes,
- Installation and assembly technicians; supervisors and managers, need to understand and have the appropriate capabilities to deliver against quality and tolerance standards that are more aligned to engineering than traditional construction techniques.

The Ministry of Housing, Communities and Local Government (MHCLG) commissioned CITB to undertake an assessment of skills needs of MMC focussing specifically on the housing sector.<sup>22</sup> The report was based on a survey of construction professionals with an understanding of MMC, and focussed primarily on the impacts on traditional construction trades. The analysis presented included scenarios which combined volumetric and panelised MMC and traditional 'brick and block' methods.

Key findings from the research suggested that using a full volumetric methodology would result in a 14% reduction in total labour requirements. Furthermore, that decline would be concentrated in trade and manual occupations where the reduction in labour would equate to around 26% of the workforce, with professional and non-manual roles remaining unchanged.

The decline in the overall workforce suggested by the survey evidence is borne out by research for this commission from live projects, where the decrease in labour requirements observed is even more significant. Though anecdotal, in one project example, using a panelised system, the overall workforce requirement was reduced by 50%.

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<sup>22</sup> The Impact Of Modern Methods of Construction on Skills Requirements for Housing, CITB

The other key finding is the shift of workforce from on-site to off-site labour. Again, in the volumetric scenario this would represent a shift of 60% of trades and manual workers to off-site locations. From our stakeholder interviews, looking at panelised systems, we saw a lesser shift to off-site, which is aligned with the CITB research which identified a 44% shift off-site for panelised systems.

The evidence from the CITB research points to a significant decline in a number of traditional construction trades, whilst others will be less impacted. The table below identifies a number of selected construction trades and the impact of a fully volumetric approach on those trades:

Occupation	Volumetric
	% change in labour
Wood trades	-50%
Bricklayers	-31%
Glaziers	-50%
Civils operatives	0%
Logistics	3%
Specialist Building operatives	4%

As outlined above, the CITB study was based on survey data and will not have been able to differentiate between methodologies adopted and impacts of different design requirements on skills demand. As noted above we have evidence that panelised systems can deliver significantly more labour efficiencies in certain circumstances, and more than the decline in a number of traditional trades, it leads to a fundamental change to the skill sets required.

CITB findings in relation to the continued demand for on-site requirements for civils operatives for example, is explained by the ongoing need for site preparation and enabling works to support installation. It should be noted, however, that preparation for installation of a re-fabricated structure requires defined tolerances that are less flexible than those for more traditionally built. The concept of 'right-first-time' becomes critical as errors are less likely to be remedied through adjustments in subsequent processes and remedial action is more costly. There is a likelihood that skills requirements will need to evolve to accommodate this. This aligns to the experience for civil engineering operatives working on HPC; for Nuclear New Build, 'right-first-time' and the authority of the design is embedded with behaviour and competence requirements.

Assembly and installation operatives are likely to require 'multi-skill' capabilities and many other trades will need to operate in a hybridised manufacturing/construction context.

There would also be an expectation that as MMC approaches became more commonplace, there would be scope for further efficiencies intrade occupations. The other element of the CITB research suggests that overall professional and non-manual occupations would not be impacted by MMC. However, the greater standardisation that MMC implies would suggest that roles across a number of occupations would decline, ranging from procurement through to design. It would also open the opportunity for further consolidation and the potential for further off-shoring of design, which is already prevalent in sub-sectors such as highways.

The above analysis is based on a fully volumetric approach to housebuilding and if delivered would not only radically alter demand for trade skills it would revolutionise how the construction sector operates. Our experience suggests that panelised and hybrid systems can create an equivalent impact in terms of overall workforce numbers. As outlined in the previous section, current take up of MMC in all its forms is likely to represent less than 10% of the market in 2019 and there are significant barriers to adoption of MMC in housebuilding. However, the Garden Communities in Essex represent a significant opportunity to address MMC, through a more diverse mix of tenure which has led to targets for MMC of around 50% for MMC for some Garden Communities.

### Digital Skills

A survey for a recent Mace report, of key clients, construction sector partners and suppliers to understand the impact of innovation and technology that is changing construction has identified 12 innovation areas that will impact the sector<sup>23</sup>:

- Advanced data and analytics
- Augmented and virtual reality
- Advanced energy storage and creation
- Advanced offsite manufacturing
- Advanced material science
- Artificial intelligence/automation of processes
- Robotics
- 3D printing and additive manufacturing
- Internet of Things/sensors
- Drones
- Blockchain
- Autonomous vehicles

The report findings established the following:

- Every stage of the property/asset lifecycle will be affected, but the area of most significant change would be 'assemble and build' operations.
  - Technology would impact different professions within the sector
  - Augmented and virtual reality will have the most significant impact on designers and architects; Advance offsite manufacturing and robotics will have the most impact for builders.
- The survey results indicated technologies expected to positively impact the sector and whether the industry has the right skills to maximise the opportunity.
  - 83% respondents identified advanced data and analytics would reach widespread adoption over the next 5 years;
  - 77% identified augmented and virtual reality over the next 5 years;
  - 75% identified energy creation and storage over the next 5 years.
- A clear majority felt that skills gaps were severe or moderate in these areas and that there was only a short period of time for industry to plan and deliver training to accommodate these advances
- More generally, 66% felt that skills gaps were either severe or moderate when considered across all 12 innovations.

Despite the opportunities that are presented by the Garden Communities to scale up MMC, the pace of change should also be balanced against the overall growth in demand for housing. Whilst a number of skilled trades are likely to see a relative decline in workforce requirements, the absolute number may grow in the short-term due to the overall growth in housebuilding and the pace at which modern methods are implemented. The continued requirements for repair and maintenance and small scale commercial and domestic construction, including environmental retro-fit, will continue to be dominated by traditional trades and local sector capability. The skills and capacity required for retro-fit will be

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<sup>23</sup> Mace, Industry 4.0 Insights report

driven by the types and scale of incentives that emerge following publication of the forthcoming Energy White Paper.

There will therefore be a continued need to develop traditional skilled trades in the short term to medium-term, whilst the relative importance of developing and attracting an off-site multi-skilled labour force for the medium to long term.

Looking at the broader impacts of MMC and productivity gains in other construction sub-sectors is more problematic. Solutions are often bespoke and there is little existing data on potential labour savings. However, in civil engineering there are potential proxies that can be used based on targets for efficiency gains in certain sectors/projects. For example, Highways England have introduced a programme of efficiency gains as part of the Roads Investment Strategy 2 period (2020-25) which represents 5% of the capital spend budget. Equally, EDF have targeted a 20% saving in the construction of the proposed Sizewell C nuclear new build.

### MMC Summary

The Project 13 model calls into question the role of the traditional contractor, but also more broadly as the cost benefit equation of modern methods of construction alters (potentially due to higher labour cost and underpinned by new technology) there is the potential for market disruptors to accelerate off-site approaches opening opportunities for many pioneering specialist engineering and construction businesses.

These changes will impact professionals and operational occupations; create additional demand for multi-skilled assembly and installation personnel. In addition, local logistics, support and professional services occupations will need consideration.

These changes are already manifest in the county's skills offer. South Essex College, through PROCAT, for example, is working with a county employer to deliver bespoke training for factory/manufacturing operatives for the housing sector, whilst Harlow College is collaborating to develop a new suite of qualifications at levels 4 and 5. These examples of a response to change offer several strategic opportunities:

- Early adoption – pioneer the develop centres of excellence,
- Collaboration and sharing of expertise across training landscape,
- Timely transition and development of skills base

There is no option to develop an enhanced skill offer that is without risk when considered against competing demands for skills throughout industry. However, it is also necessary to consider the long-term legacy of an approach in addressing nationally identified traditional 'pinch points' and emerging skills needs. The scale of development, both in the county, the East and South East of England, London and nationally will, inevitably, create a demand for workers with specialist skills in this area, potentially creating a pipeline opportunity for Essex to 'export' expertise in MMC.

### Impact on Labour Supply and Demand

The potential use of MMC on major housing sites in particular, has the potential to improve productivity, meaning that fewer workers could be required than under the 'business as usual' central scenario of supply and demand presented in Chapter 4. To test this impact, a revised supply and demand model has been created, with the following amended assumptions:

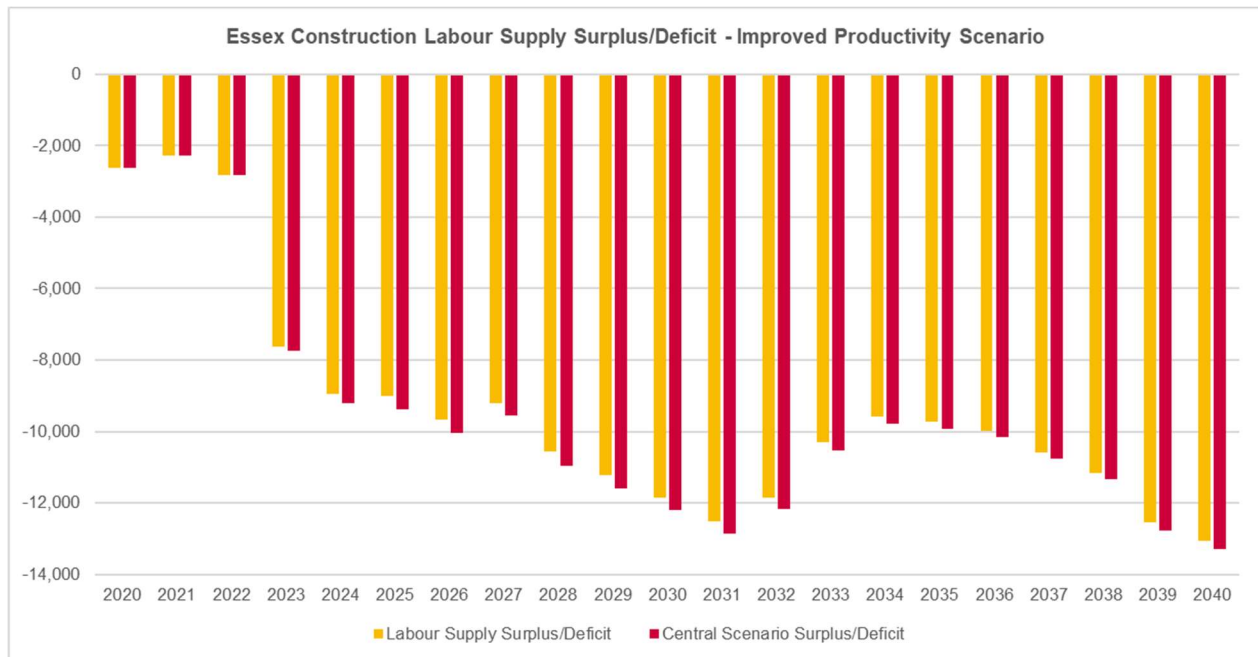
- 50% of homes on New Garden Settlement sites delivered using Volumetric MMC approaches by 2030



- 5% productivity gains by 2025 on Lower Thames Crossing and all other infrastructure projects (except BRB, which already incorporates efficiency gains relative to HPC)

For the housing sites, this has the effect of reducing the number of skilled trades and other site-based staff, whilst still delivering the same number of homes. The impact of these adjustments on the overall level of labour deficit is summarised in Figure 5.1.

**Figure 5.1: Impact of MMC on Labour Deficit**



Source: CITB/WLC, Mace modelling

As demonstrated above, the adoption of MMC techniques has a relatively small impact on the overall deficit. At peak deficit in 2031, it is estimated that around 340 fewer workers would be required than under the central scenario.

## 5.4 National Infrastructure Investment Agenda

Following a decade dominated by austerity in the wake of the late 2000s global financial crisis, political appetite for major infrastructure investment has returned, with a significant number of nationally-significant projects on the agenda. This is exemplified by the recent approval of High Speed 2, which is central to the Government's 'levelling up' agenda, and, prior to the recent successful legal challenge, Government support for Heathrow's planned third runway.

Notwithstanding the effects of Covid-19, and the significant level of public debt currently being incurred in supporting the economy, the progression of a number of megaprojects within a relatively short period of time has potential to boost demand for construction skills nationally. It is likely that Essex will have a role to play in delivering infrastructure beyond its boundary. Some of the projects most likely to impact on Essex are discussed below.

### Sizewell C

Sizewell C in Suffolk is the biggest megaproject by value, and closest to Essex, that will impact the Essex construction supply-chain and workforce. The Sizewell C Economic Impact Assessment assumes around 2,000 home-based workers could be employed on the main site at the peak of the

construction process. The defined, 90-minutes commute area covers the in-the-main, Suffolk and Norfolk rural and urban areas. However, a significant area of North Essex is identified within the catchment.

Sizewell C is more mature than Bradwell B in consultation and planning; there is opportunity for Essex to benefit from SZC skills investment, including 'go-early' skills interventions exploiting progress at HPC. This 'Nuclear New Build' response potentially enables Essex supply chain and potential workforce to up-skill and develop capability and capacity in advance of BRB and support the provision of a work-ready pipeline for the project. Furthermore, SZC offers broader legacy opportunity for the sector to capitalise through skills and capability development that has arisen as a result of the project; specially focusing on enhancing engineering, fabrication and assembly, capability in the supply chain and to develop enhanced qualification attainment in the region.

Whilst it must be considered that legacy outcomes do not create unnecessary surplus of specialist skills when the project is completed this pipeline of skills and capability development opportunity – from HPC to SZC to BRB – if made available, should be exploited to offer a longer-term opportunity. BRB is well placed, both geographically and in terms of the Nuclear New Build sequencing to maximise impact and provide long-term opportunity.

### High Speed Two

In April 2020, the Department for Transport gave approval for HS2 Ltd to issue Notice to Proceed for the main civils contractors working on the project. The announcement is significant as, mid Covid-19 crisis, it signals the intent of the government to support major infrastructure projects. The announcement confirms the government decision to support phase one of the scheme in February 2020 to Birmingham. The aim is for Phase 1 to be operational by 2029, but with trains initially terminating at Old Oak Common in West London, ahead of opening Euston in 2033.

In Phase One, peak employment is likely to be reached in 2023 at 30,000 which corresponds to the construction peak (25,000), with the rail engineering workforce rising gradually to a peak of around 9,000 in 2025. The National College for High Speed Rail (renamed as the National College for Advanced Technology and Infrastructure) has been established with bases in Doncaster, Birmingham and Newham College in London with a focus on providing higher level skills predominantly for the rail industry.

Of particular relevance to the Essex labour market is the work being undertaken in London, with two key stations, at Euston and Old Oak Common and the new rail line which runs north westwards out of central London. In terms of the two stations, employment is likely to reach a peak workforce of around 2,500 in 2023 and will be sustained at this level through to 2028. Our discussions with project managers, has highlighted the requirement for civils operatives and a focus on lower skill levels, with a majority of trade occupations at level 1 and level 2.

### Heathrow Airport Expansion

The Heathrow Airport Expansion programme is designed to increase capacity at the UK's international hub airport from approximately 80 million passengers per annum (mppa) to approximately 142 mppa by 2050 with over 750,000 air transport movements per year.

The development is due to take a phased approach with the first phase focused on the opening of the third runway to the north west of the two current runways, to include the removal of existing buildings and the consolidation of the external airport boundary. In broad terms terminal capacity would remain the same through this phase. Phase 2 would focus on increased terminal capacity, initially by extending



Terminal 5 and developing supporting infrastructure, such as a new southern road tunnel and consolidation of parking facilities. Further phases, starting in approximately 2030 would see further expansion of terminal capacity and parking facilities.

The Preliminary Environmental Impact Report<sup>24</sup> estimates the total job years for the construction phase is between 89,000 and 98,000, with the majority being in Phase 1 of the project. Peak construction was anticipated in 2023 with 14,000 construction jobs, of which 3,500 were expected to be local<sup>25</sup>,

Phase 1 of the scheme is heavily focussed on civil engineering with an estimated 23% of the workforce falling into the labourer and civil engineering operatives' category and a further 7% of the workforce being plant operatives. From phase 2 onwards, whilst the overall numbers are lower, the focus on construction of terminal building facilities and fit-out will see a greater emphasis on trades such as: wood trades; electrical; plumbing, heating and ventilation.

The analysis undertaken by Heathrow suggest the largest skills gaps are likely to occur in the following occupations: civil engineering operatives, civil engineers, plant operatives, construction trades supervisors, labourers, and scaffolders. Amongst the commitments Heathrow has made is towards leaving a skills legacy from the scheme. A commitment to delivering 10,000 apprenticeships by 2030 is written into the Airports National Policy Statement<sup>26</sup>, though it should be noted that this cuts across all aspects of Heathrow operations and it is estimated will result in around 1,000 construction apprenticeships.

The table below outlines the projected skill levels for the Heathrow expansion scheme trades and manual workers

Construction skills requirements by level for Phase 1 of Heathrow expansion	
Skill level	Workforce %
NVQ 4 +	11%
First Degree	8%
NVQ level 3	20%
Trade apprentices	10%
NVQ level 2 and below	35%
Other qualifications	13%

The above analysis does not take into account the role of hubs, which will see a proportion of the workforce located at sites away from the construction site and does not take into account any efficiencies generated from off-site manufacture. However, the impact on the workforce in phase one is likely to be marginal.

As outlined earlier, the Court of Appeal decision in February 2020 regarding the legality of Heathrow expansion, ahead of the current crisis, would delay the project. It is likely that in a best-case scenario phase 1, runway opening, would be delayed from 2026 to 2029. The ramifications of Covid-19, particularly on the aviation sector, where traffic has reduced by more than 90% are not fully understood as yet, though Heathrow CEO, John Holland Kaye, has been quick to reiterate the importance of the sector in driving the UK economy.

<sup>24</sup> Preliminary Environmental Impact Report...

<sup>25</sup> Local is defined as the 'core study area' and includes: Hillingdon; Hounslow; Elmbridge; Spelthorne; South Bucks; Slough; Windsor & Maidenhead; and Runnymede

<sup>26</sup> Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England, DfT, June 2018

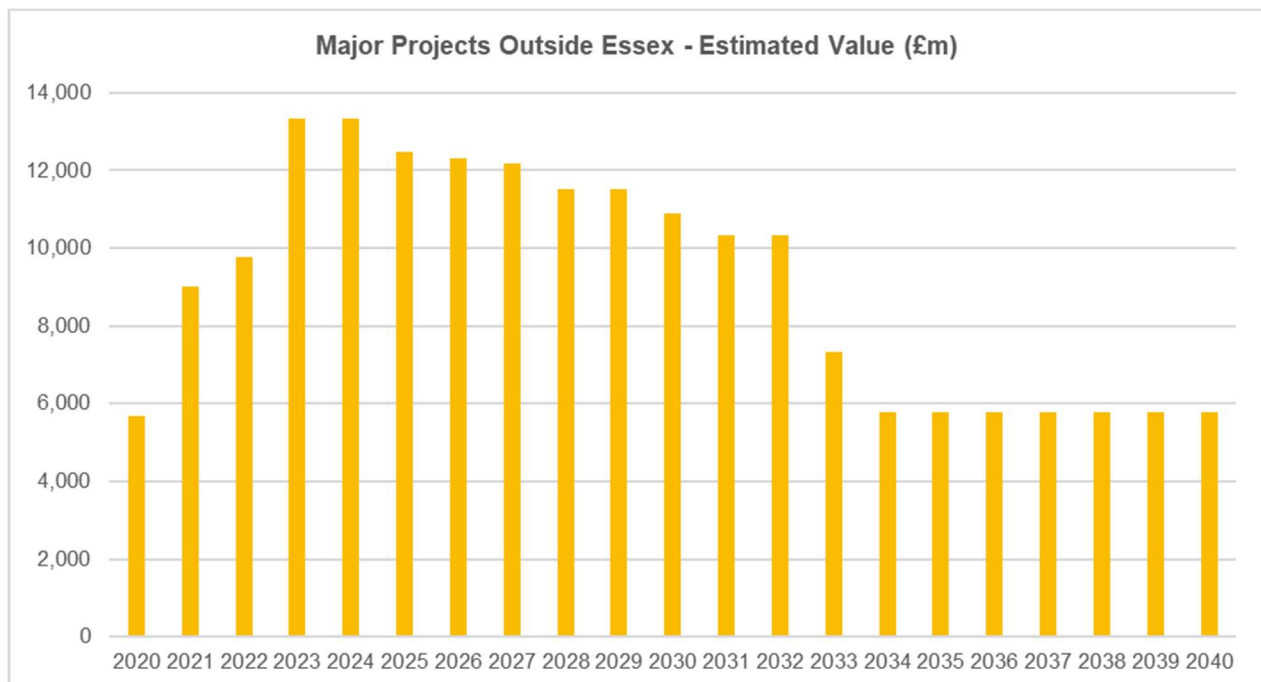
### Other Major Projects

In addition to the key projects described above, a number of other major projects are proposed. The main projects likely to impact on Essex are listed below:

- Thames Tideway Tunnel
- London Resort
- A428 Black Cat to Caxton Gibbet
- Silvertown Tunnel
- Cambridge Metro
- East West Rail – Bedford to Cambridge
- Crossrail 2
- East Anglia wind farms

Figure 5.3 below summarises the estimated phasing of the projects defined above in terms of value. Note that this is based on a 'flat' profile across the anticipated duration of each project.

**Figure 5.3: Value of Major Projects (outside Essex)**



Source: Mace research

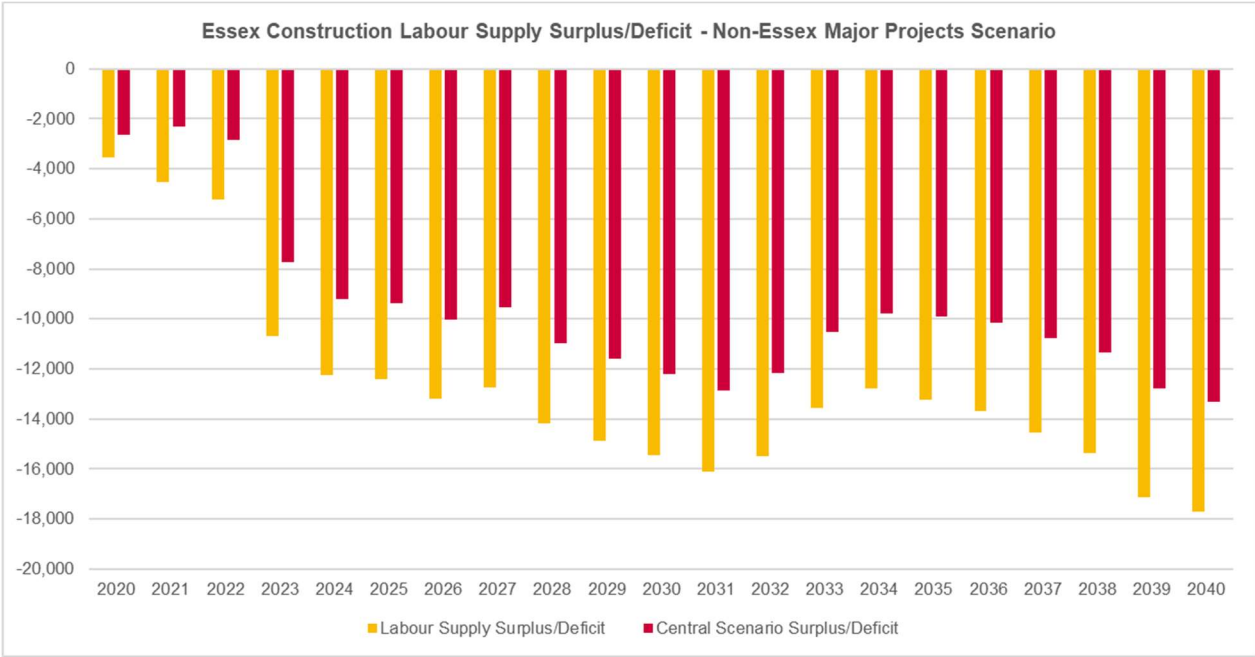
At present, the peak in terms of value is expected to occur in 2023, reducing gradually until the early 2030s. At present, HS2 and Heathrow Expansions are the main long-term projects extending into the latter stages of the assessment period.

### Impact on Labour Supply and Demand

As with the Essex major projects analysed in Chapter 4, little information is currently available around the numbers and types of role that these projects are expected to require. In order to estimate, at a high level, the approximate labour requirement associated with these projects, a labour coefficient for major infrastructure projects has been derived from ONS data. Furthermore, it has been assumed that Essex will account for 4% of this labour demand, based on the proportion of jobs in both London and Suffolk (where the largest projects are located), which are filled by Essex workers across all industries.

This is based on data from the 2011 Census. Figure 5.4 below summarises the impact based on these input assumptions.

Figure 5.4: Impact of Non-Essex projects on labour deficit



Source: CITB/WLC, Mace modelling

On this basis, the major projects outside Essex which have been identified have the potential to further exacerbate the labour deficit predicted within the Supply and Demand assessment.

## 6. Conclusion – Opportunities, Challenges and Recommendations

This report, drawing from existing data, research and engagement with key stakeholders, provides an analysis and qualitative research to define the key opportunities and challenges in the sector over the next 20 years. This chapter brings together the key findings and makes a number of recommendations for consideration.

### 6.1 Summary of Findings

The report was commissioned in the context of a buoyant construction sector in Essex and across the UK economy. The sector is set to grow significantly, driven by infrastructure investment and an ambitious programme of house building focussed around the creation of Garden Communities.

Expansion in the sector is set against the context of high economic activity levels, an ageing workforce exacerbated by a failure to recruit young people into the sector alongside the uncertainty of the labour market adjustment in migration policy, as part of withdrawal from the EU.

Our analysis forecasts that there will be a significant short-term gap between labour demand and supply. Improved efficiencies through the adoption of MMC have the potential to mitigate these shortfalls to an extent. The research suggests that the balance of factors that influence the take-up of MMC, will lead to an acceleration of this process.

### 6.2 Areas of Focus

Based on the findings of this commission, it is recommended that Essex County Council focus on three key themes:

- Promoting greater efficiency in the construction sector
- Sector Skills and Education
- Enabling FE delivery to respond to opportunities

Construction acts as an enabler for the wider economy. Improving productivity in the construction sector has the power to speed up delivery of projects, including infrastructure to support wider economic growth, reduce cost and produce improved outcomes for society as a whole. The construction sector is at the cusp of an MMC revolution which will, over the long-term, radically alter how the construction sector is structured and will impact on the skills required to deliver construction projects.

The sector is not currently structured to respond to the changes required due to a number of factors including an inherent conservatism in the sector, which is exacerbated by a traditional procurement and project delivery model that delivers low margins and does not promote innovation. This inherent problem has a knock-on impact in terms of the level of engagement with the training infrastructure and low levels of investment in skills.

The scale of growth in construction activity in Essex over the coming years is unprecedented and the focus on large scale infrastructure, as well as a coordinated approach to housebuilding, through the Garden Communities provides the opportunity to maximise collaboration to influence change. A higher degree of coordination and collaboration amongst key stakeholders, developers and supply chain partners offers the opportunity to encourage change in behaviours to support more strategic investment in the sector.

### Developing the construction supply chain

Evidence nationally, amongst large scale contractors, suggests a lack of knowledge of the potential impact of MMC on how the construction sector will evolve over the next 10 years. In addition, as more collaborative contractual models are rolled out, behaviours in the sector will have to adapt, at all levels in companies, but driven by business leadership.

The large-scale infrastructure developments in Essex bring together a number of stakeholders that are at the forefront of change in the construction sector. Bradwell B will be the third new nuclear power station in the current expansion programme. Already the challenge set for Sizewell C, in neighbouring Essex, is reducing construction costs by 20% from Hinkley Point (HPC) and learning from HPC is pointing towards more collaborative working in the supply chain to deliver efficiencies.

Equally, Highways England has focussed on more long-term collaborative frameworks to deliver cost-saving across its capital build programme. The Regional Investment Programme has introduced a five-year framework period and is designed to improve collaboration between tier one organisations and the supply chain, including developing joint plans to attract and develop a regional workforce.

Both EDF/CGN and Highways England have set a clear direction in favour of increased efficiencies through greater collaboration and the Garden Communities have set challenging targets for the use of off-site construction in their developments.

### Collaborative network

The significant infrastructure projects planned over the next 20 years bring together a number of key stakeholders in Essex that have a strategic vision for improved efficiency in the construction sector and shared workforce needs. The role of the client is key in driving improved outcomes from their programmes and through improved coordination of activities, sharing of good practice and the development of a strategic approach to both skills and innovation.

A construction innovation network led by the local authority and key primes and developers would play a strategic role building on a set of core principles around: leadership; communication; collaboration and coordination; and capability.

The strategic objectives would include:

- Lobbying and regulation – strengthening links with Government and other organisations to attract support and investment
- Supply Chain Development – improve awareness of implications of technological change and support the development of a construction manufacturing cluster, through engagement with developers and Tier One contractors
- Skills – drive improvements in alignment in training provision and addressing skills gaps.

Coordination across the sub-sectors of construction would allow for the development of synergies, potentially offering opportunities for efficiencies and coordinated delivery and the exploration of opportunities to collaborate, through for example, adoption of joint platforms or the rationalising of use of components.

Such a network could in the first instance create greater clarity to the supply chain through:

- The development of construction sector **technology roadmaps** at regional level which would provide a unifying vision for technological advances in order that supply chain firms are better able to understand future opportunities and priority technologies
- The development of regional construction sector **procurement pipelines**
- Feasibility study for the development of a '**MMC integrator**' role to support the development of a regional supply chain offer to support Tier Ones and to tackle barriers of entry for smaller developments

### Construction Supply Chain School

The existence of significant construction programmes delivered over a long timeframe provides the opportunity to support the development of the local supply chain in traditional construction but also linking to the advanced manufacturing sector. The expectation is that projects of the scale of Bradwell B will deliver supply chain support alongside visibility of supply chain opportunities. Aligned with the aims of the collaborative network identified above, we would see benefits of extending such a programme to cut across major construction contracts in Essex.

There are existing models of supply chain school, such as the Sustainability Supply Chain school supported by the CITB and involving a number of key contractors in the sector. The focus of a regionally-focussed supply chain school would be to create a link between regional leadership, the main contractors and the local supply chain, with a focus on collaboration and innovation. Support would include mentoring, technical support and networking, alongside specific technical and behavioural training.

One of the key barriers to the development of MMC are deficiencies in the supply chain. There is the potential for a regional supply chain school to perform some of the functions of the 'integrator' in an alliancing model, helping define the enterprise and bring supply chain partners together to deliver. Such an approach could also encourage the adoption of modern methods amongst SMEs, such as small housebuilders who would otherwise not be able to invest in manufacturing capacity.

### Promotion of innovation through collaborative procurement models

The traditional transactional construction contractual model does not support the adoption of innovative practices and instead has the tendency to encourage confrontational behaviours.

The Institution of Civil Engineers are leading Project 13, which is an industry-led initiative to improve the way large-scale infrastructure is delivered and managed centred on greater collaboration and sharing of risk and opportunity. Collaborative models, which include alliancing, vary in maturity but are characterised by: extended procurement timeframes; closer collaboration between client/owner and suppliers; focus on outcomes and innovation. Highways England are amongst the earlier adopters of Project 13 and the aims are reflected in Procurement Frameworks which rely on the development of long-term relationships and collaborative behaviours.

The local authority should look at its own procurement frameworks and look at how these could support greater certainty for contractors, through extended construction frameworks and through more collaborative contract models, such as Alliancing. In particular, the local authority is in a good position to look at best practice in construction sub-sectors and investigate opportunities for synergies, for example between the Highways Authority and Highways England.

### Development of an MMC cluster and Enterprise Zones

Alongside low productivity the construction sector is marked by low margins which prevent long-term investment. There is also a lack of capacity in the MMC supply chain which acts as a barrier to growth in the sector. The Enterprise Zone model has the potential to accelerate the take-up of MMC and increase the potential for research and development.

The growth in the housing market in London and the focus on high density accommodation, alongside the constraints faced by the construction sector in the capital is driving demand for off-site manufacturing. The Construction Sector Deal does highlight the core of the construction manufacturing base in the midlands and north of England. However, with the focus of demand in London and the importance of reliability of logistics movements, alongside the demand created by planned housing growth in Essex there is the potential for clustering of off-site manufacturing in the county.

### Sector Skills and Education

This report highlights the sector's skills decay, particularly for craft and operative occupations, and the marginal impact FE taught courses have in addressing this. In summary, this is because learning outcomes do not qualify competence. Competence is measured in the workplace and is an assessment of acquired experience, knowledge, understanding and skill. Apprenticeship frameworks and standards accommodate the development of competence as do NVQ qualifications as a vehicle to assess experienced workers.

The sector has aligned to NVQs; CITB maintains the underpinning National Occupational Standards that define the qualification structures. CITB is only responsible for the standards and structures defined as 'in-scope' occupations. Other standard setting bodies, including ECITB, have responsibility within their own scope. This structural complexity is reinforced by the SIC and SOC; whilst standard setting bodies do collaborate to support interdependencies established sectors and sub-sectors are entrenched within these structures and definitions.

Qualifications and the frameworks they sit in have been experiencing a period of reform; the reforms respond to recommendations for technical education and include the change from apprenticeship frameworks to standards and the development of T'levels. However, the reforms do not address the structural complexities, increasingly, innovation and technological advancement is outpacing the traditional sector and occupation definitions. The design of the new apprenticeship standards, including graduate apprenticeships need to incorporate the future need for a multi-skilled, multi-sector, adaptive workforce, accommodate transferability and be able to respond to technological advance, and the inevitable move to more off-site manufacture and assembly must inform the content of training and qualifications.

A Mace Insights report in 2017<sup>27</sup> made a series of recommendations:

- **Accelerate the use of new technology in training** – The digital revolution has changed the way that teaching has evolved, and the potential benefits of using augmented reality to provide new learning environments and to upskill existing staff have already been recognised. Use of this type of innovation in learning should be accelerated immediately, both to improve the training of new skills in apprenticeships and further education courses and to upskill operatives by making training more accessible.
- **Promote the industry's use of technology in primary and secondary schools** – Ingrain the idea of construction as being innovative. The creation of construction clubs could teach children the basics of

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<sup>27</sup> Mace Insights Moving to Industry 4.0 A skills revolution



how buildings are designed and built and could even include mini construction projects that utilize technology such as 3D printing.

- **Inform lifelong learning decisions** – There are very clear benefits to engaging with education and learning across a lifetime. It allows people to upskill for a particular career path, reskill for a career change, catch up on learning, respond to changing circumstances, remain in the labour market for longer and become more productive.

Engagement in Essex and the data analysed in this report supports a conclusion that, whilst there is clear evidence of 'early adoption', these recommendations are relevant today. A strategic focus should seek to stimulate their acceleration but also be prioritized against the defined demands for the growing need for 'Non-construction Professional, Managerial IT and other office-based staff' and shortages of 'Electrical trades and installation', 'Plumbing and HVAC trades', 'Labourers', 'Plant Operatives' and 'Civil Engineering Operatives'.

It also concludes that there are grounds to challenge the existing structures and methods that inform sector skills analysis, education and training development that protect traditional definitions, do not recognise the overall contribution of supply-chains and potentially restrict innovation.

### **Enabling FE delivery to respond to opportunities**

There needs to be a specific focus on capability and capacity for the counties FE colleges. Chelmsford College, Colchester Institute, Harlow College and South Essex College, account for nearly two thirds of construction delivery in the county. The following outline key areas to priorities:

#### **Enable knowledge transfer**

There are examples of STEM innovation and bespoke training development responding to the demands and advance of industrial technology, particularly manufacturing. These should be exploited across the FE network and innovation should be encouraged and take up of courses and qualifications promoted. Opportunity to include private provision should also be explored to create an Essex curriculum, support innovation, prevent proliferation and widen access. The Federation of Essex Colleges could support a strategic alignment to enable this.

The risks associated with 'early-adoption' and market failure for new programmes should be mitigated through the formation of the alliances across sector areas supporting the promotion of transferability and access to employment opportunities.

#### **Encourage FE resource sharing and collaborative recruitment**

Essex's FE delivery in construction is well developed, but colleges express concern that tutors and trainers are increasingly difficult to recruit. As skills challenges evolve employers should be encouraged and enabled to support the development of training capability. This could be supported through collaborative intervention, including obtaining commitment through Section 106 for sector employers to develop a network of associate tutors and assessors, and enabled through aligned curriculum development supporting shared resources.

Commitment to develop an Institute of Technology Programme Competition proposal, bringing together Further and Higher Education providers and employers through SELEP, championing collaboration would further these ends. It should focus to support the delivery of technical knowledge transfer and address issues associated with competition for resources.



### Develop responsive solutions for up-skilling and re-skilling existing workers

Many of those working in the construction industry will need to adapt their skills to make them more relevant and resilient for the future in response to a changed economic landscape resulting from the 2020 pandemic as well as advances made through innovation. This ultimately means that training must be made to have sustainable outcomes that provide access to work and development over a working lifetime. They must also deliver the right outcomes in terms of transferability, skills levels and occupational competence.

## 6.3 Delivery Solutions

### Major Projects

Major projects offer a significant opportunity to develop skills in the county through S106 and Social Value commitments. However, specialist occupations that have been highlighted as ‘pinch point’ occupations for major projects in the past, such as tunnelling and high integrity welding, need to be considered carefully.

Such specialist occupations offer attractive pay rates and might initially seem an attractive option for regionally focused skills and training development in support of specific projects. However, they are often high risk when considered against the amount of investment required to build capability and capacity for training. Highly specialist sector is often supplied by specialist contractors who, themselves, supply to international demands and draw from, limited, but very experienced specialist resource pools. The lead in time to acquire the right levels of competency is significant and local training interventions require significant investment, do not provide supply into established local sectors and projects rarely have enough lead-in time to adequately train to the levels of competence required.

BRB is the most mature major project in the county. Considering the impact of HPC in Somerset and SZC in Suffolk commitment and investment should align to the current nuclear new build approach but clearly offer sustainable legacy outcomes for the county. There is the potential to support the county’s prospective supply chain and develop the skills that will be demanded by projects whilst establishing capability to succeed beyond them. Following the rationale of a recent CIOB report – that a narrow definition of construction dismisses the overall contribution the sector makes to the economy - this should not be focused exclusively on traditional site construction<sup>28</sup>.

- Engineering manufacturing/fabrication and materials suppliers should be enabled to benefit from increased demand for prefabricated construction components and supported to build capability and capacity to supply to the project. Investment in this sector will develop the county’s manufacturing capability and will align to emerging technologies and methods for off-site fabrication and assembly as well as supporting supply to sectors such as offshore wind. This would include opportunity to develop welding capabilities for fabrication that would not necessitate the demands of high integrity work and should also accommodate ‘Electrical trades and installation’, ‘Plumbing and HVAC trades’.
- Whilst there is already engagement in Suffolk to develop training capability for occupations such as welding, the opportunity should not be overlooked for North Essex businesses and workforce supply to SZC and BRB.

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<sup>28</sup> CIOB, The Real Face of Construction 2020

### Major Projects – Social Return on Investment

Major projects offer considerable opportunity to deliver social value for the county and employment and skills are a key theme within any social value strategy. The counties sector demographic identifies civil engineering as underrepresented against other construction occupations – Level 2 NVQ Diploma in Construction and Civil Engineering Operations (Construction), alongside similar interventions for General and Plant Operatives could be promoted as an opportunity to develop competence, provide access to working opportunities and a vehicle for progression to higher level qualifications in site supervision and management; this would offer a local supply of labour for key infrastructure projects and start to address the county's deficit at level 2 and above.

For Essex, considering qualification achievement and socio-economics, the recommendation would be to focus upon progressing to and beyond level 2 for operational occupations and to benefit from developing higher level skills that have a transferable currency such as digital engineering, data management and controls, as well as generic programme and project management.

In this context, it would be advisable to highlight opportunity for general and multi-skilled occupations, transitional (construction/meh/manufacturing) trades such as welding and higher-level technical training in areas such as those identified as offering opportunity in the current and emerging local sectors. In summary:

- Exploit 106 agreements and Social Value commitments to build skill legacy – This should prioritise the region and ensure outcomes align to local needs beyond the lifecycle of the project, support for shared apprenticeship schemes, job brokerages and local employment and supply-chains.
- Address progression qualification attainment deficits – Support progression pathways from a level 2 baseline (e.g. civil engineering and welding) in occupations that enable the workforce and local supply chains access to frameworks for major projects and support progression.
- Promote higher level skills and education to increased capacity and capability with transferability within local sectors and in alignment with emerging sectors – Advanced data and analytics, Augmented and virtual reality, Advanced energy storage and creation, Advanced offsite manufacturing, Advanced material science.

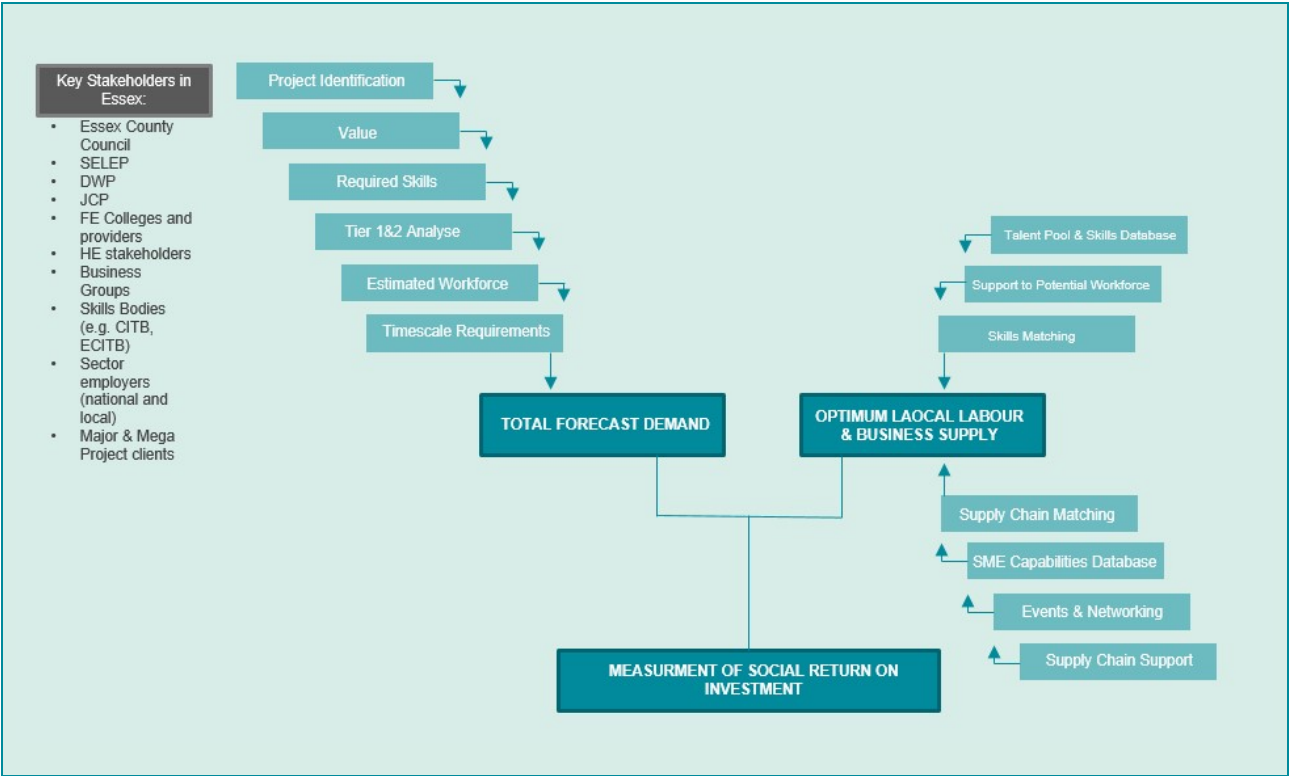
The following themes should be considered to assist Essex County Council when considering future Socio-Economic strategies and Social Value Delivery Models for major projects:

- **Aligned strategic approach:** That an overarching approach to socio-economic assessment and social return on investment is adopted.
- **Governance:** That effective governance arrangements are in place.
- **Up-to-date demand forecasting:** That robust and systematic work demand pipeline management and anticipated resource forecasting is undertaken.
- **Resource and capability tracking:** That systematic methodology for tracking of the progress of individuals alongside a schedule of capabilities of potential supply chain companies in the county is developed.
- **Supply chain mentoring and engagement:** That engagement and supporting to the potential local supply chain in Essex is prioritised.
- **Methodology:** That a potential future delivery methodology (shown below) is considered that enables:
  - supporting people into work

Conclusion – Opportunities, Challenges and Recommendations

- working with local SME businesses to create supply chain opportunities.

The following shows the evolving model delivering social impact through two integrated workstreams:



## Coordination around key sub-sectors

There is no single way to address these opportunities and challenges, however, consideration should be given to establish a methodology that best combines as many strategic priorities as possible. The significant programme of major infrastructure projects provides a clear rationale for a strategic approach. Core to this would be to establish networks that best serve these ends. Whilst there are regional groups established and operating in this space, the formation of an Essex Skills and Supply Chain and Alliance (ESSCA), drawing from these existing groups and complimented by appropriate parties such as employers and unions can focus on bringing together sector and cross-sector interdependencies with an overarching strategic intent and to lead the delivery of interventions focused on skills and innovation. We also identify immediate actions that respond to the current Covid-19 crisis and its impact on employment, workforce and training providers:

What:	How:	
	Immediate action	Medium - term consideration for long term impact
Leading collaboration	<p>Bring together existing skill stakeholders (Providers, Skills Bodies, Employers and Unions) and align strategic intent (Essex Skills Alliance).</p> <p>Establish baseline data and insight relating to the immediate impact on business resilience, failure and unemployment.</p> <p>Broker engagement between skills and employment stakeholders – assess impact on capacity and capacity within existing networks and identify immediate and other emerging impacts.</p> <p>Identify potential partners in other regions (e.g. LLDC, neighbouring counties).</p> <p>Review council's own capability provision and explore skills and expertise needed to respond to emerging challenges.</p> <p>Development a submission for Institute of Technology</p>	<p>Exploit opportunity to review employment and skills landscape and develop approaches through Essex Skills Alliance of stakeholders (Providers, Skills Bodies, Employers and Unions).</p> <p>Lead the county's response lobbying and supporting the delivery of strategies for post-Covid-19 employment and skills investment and funding.</p> <p>Lobby education and skills bodies to accelerate achievement and progression to full competence.</p> <p>Encourage collaboration within supply chains to build resilience and improve productivity.</p> <p>Develop submission proposal for Institutes of Technology Status with a focus on existing good practise and linked to emerging construction innovation and enterprise.</p> <p>Establish a complimentary 'one-stop' employment and skills delivery methodology:</p> <ol style="list-style-type: none"> <li>1. Align existing provision for job brokerage, skills delivery and shared apprenticeships</li> <li>2. Accommodates emerging skills needs and cross sector dependencies.</li> </ol>
Responsible procurer	<p>Review Section 106 and social value strategies to support employment and skills interventions.</p> <p>Mandate engagement with established skills enterprises such as shared apprenticeship schemes and social enterprise schemes providing employability interventions.</p> <p>Review supplier frameworks and contracts – signpost at-risk contractors to support programmes.</p> <p>Work with suppliers to identify capacity to offer short term job opportunities, traineeships and/or apprenticeships.</p>	<p>Enhanced collaboration in Essex supply chain through development commercial alliances to access supply chains.</p> <p>Cascade to supply chains and develop enhanced, priority commitments for:</p> <ol style="list-style-type: none"> <li>1. Shared apprenticeship schemes</li> <li>2. Direct employment obligations to build resilience.</li> <li>3. Support the development of supply capability through and skills brokerage (supply chain school).</li> </ol> <p>Continually review social value requirements to support contextual relevance.</p> <p>Consider potential investment routes to support access to training and development</p>

Collaboration will be central to this approach. Working with the SELEP to develop a submission for Institute of Technology focused around existing good practice in Essex and themed to address the needs of emerging construction methods associated with manufacturing and assembly would advance these ends; a drive to establish off-site enterprise and capability in the supply-chain will drive the economy for demand, and this, supported by a 'supply chain school' that supports the development of capability for Essex enterprise.

However, a more ambitious option is to align this approach with the creation of a hybrid shared apprenticeship, construction academy which is either directly aligned to, or includes, a jobs and skills brokerage function to establish a 'one-stop' approach. In doing this, it is important that the resulting enterprise is not seen to be competing with established delivery and collaborates within existing frameworks as a broker for skills delivery and employment. In this context stakeholders such as: Skills Bodies (CITB, ECITB etc.); ECTA; SECTA; county providers; and key employers would need to be aligned to a shared strategic intent and have an appropriate stake in governance.

### 6.4 Pioneering Recommendations

Whilst no single issue, challenge or opportunity identified in this report is unique to the county, collectively the Essex employment and skills landscape can benefit from a specific and ambitious response.

Responding to the employment and skills challenges identified in this report will require commitment and collaboration. It will be necessary to establish aligned strategic intent with existing stakeholders and to build new partnerships. Also, the appropriate structures will need to be in place; underpinned through governance and oversight and a delivery plan will need to be established.

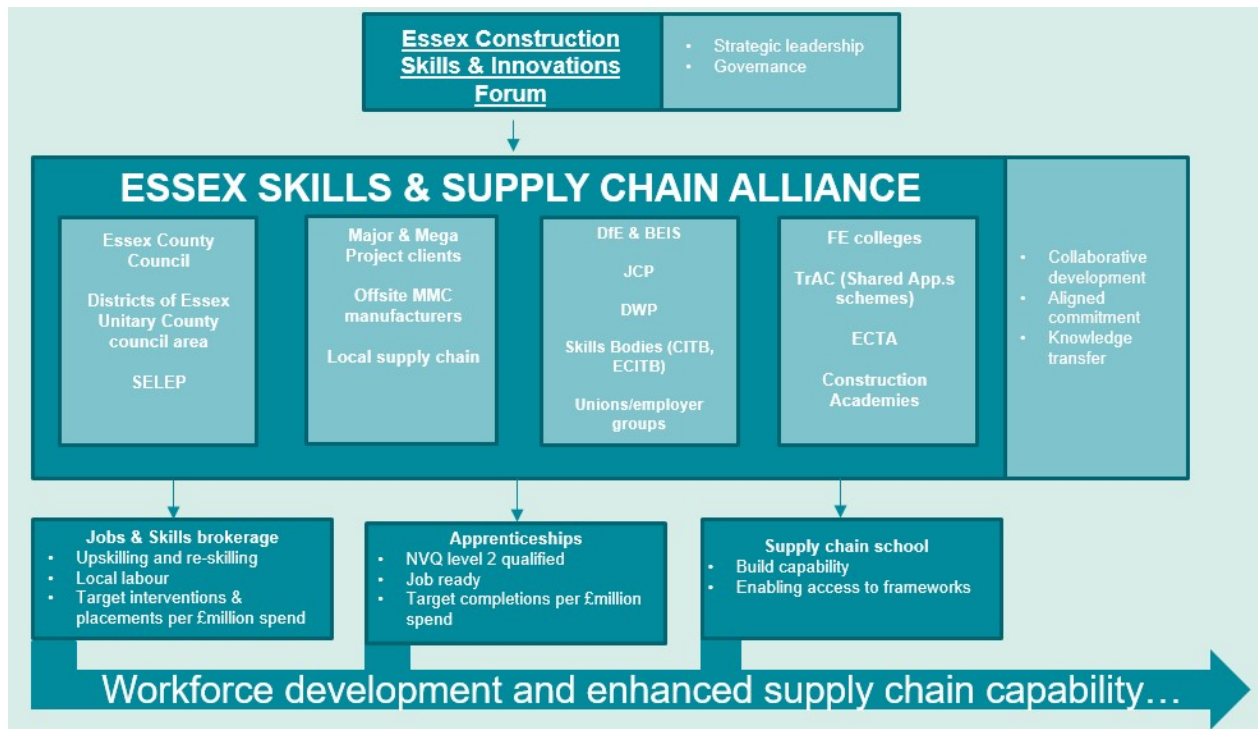
#### **Essex Skills and Supply chain Alliance:**

The creation of ESSCA, supporting employment and skills brokerage, apprenticeship delivery and building supply chain capability through a supply chain school, deployed in Essex, could be further developed and refined to provide a vehicle to homogenise the county's response to the challenges highlighted in this report and go further to target the economic impacts of Covid-19.

With a key objective to create a sustainable supply of skilled workers to the sector with core competencies and technical skills as well as the appropriate behaviours needed for sustainable career opportunities, and to support Essex businesses develop capability to access opportunities as they emerge.

Key to achieving this would be to gain the support within a governance framework and engagement with associated stakeholders. Earlier in this section we outlined the role of a strategic construction innovation forum - The Essex Construction Innovation Forum, drawn from key sector developers and contractors in the region which could act as the Strategic body with ESSCA acting as the main delivery body.

This collaborative model could be established as a unique solution with the necessary flexibility to evolve over time, the authority to influence policy and funding bodies and drive productivity in the county.



The ESSCA will also support the network of stakeholders and structures to provide an authoritative voice that can engage with Government and Industry to access funding, influence change, and develop proposals to create solutions in the following areas:

### Apprenticeships and Fast-track routes to competence:

- **Establish the necessary stakeholder framework to develop collective authority** – engage with the established sector skills interest groups to confirm a strategic alliance. This should accommodate the broader construction sector, including emerging skills needs and should align to the Construction Leadership Council's strategic intent. This should include:
  - Apprenticeship levy and alternative uses – consult, collaborate and lobby to establish alternative focus that exclusively enables 'new entrant' apprenticeships or pre-apprenticeship programmes as well as digital upskilling and 'future proofing' competence.
  - Influence increased collaboration across skills bodies and cross-sector interdependencies.
  - Supports 'local' priorities within aligned strategic intent.
  - Demonstrates understanding or regional impacts and interdependencies – for example, London projects will inevitably continue to be a draw Essex worker. Essex County Council could seek to engage directly with the London Legacy Development Corporation and identify collaborative skills opportunities and mutual benefit.
- **Engage with sector bodies and awarding organisations** – promote and explore opportunity to establish methodologies supporting fast-track routes to competence:
  - Validation of simulated work-place environments for training and assessment that can provide the necessary experience to accommodate the development of occupational competence,
  - Collaboration and alignment across sector bodies to support transitional skills pathways and to develop emerging sector competence standards and assessment criteria for multiskilled operatives, supervisors and managers and technical occupations.



- Lobby for a review of existing Apprenticeships Frameworks, Standards and competence standards to identify redundancies and opportunities to abridge (this might focus on reducing the scope of some crafts/trades in specific occupational circumstances to 'basic skills competence' e.g. for a trowel operative/bricklayer who is only required to lay bricks to 'line and level', a site carpenter who is only required to fit frames and hang doors) – if supported and validated by the appropriate skills body this will enable access to site, could be aligned to cross sector pathways and support opportunity for ongoing skills development to full trade competence or multi-skilled accreditation.
- **Establish FE capability to pioneer delivery** – encourage and support FE and employer collaboration to establish need and build capability for tutors. This could provide opportunity for construction sector operatives working toward retirement transferring into training and assessment roles; the development of associate, technical and professional lecturers and tutors supported by employers and encouraged through Section 106 agreements

### Shared Apprenticeship Schemes:

- **Mandate use of existing scheme in social value commitment** – where supply-chains do not currently offer apprenticeship opportunities request that they demonstrate engagement and support for established schemes for construction. Ensure Social Value commitments focus on time on the job and/or completions rates, not on starts.
- **Expand scheme/s to include emerging and related sector frameworks and standards** – enable non-construction supply-chains to take advantage of shared apprenticeship schemes and focus on developing cross sector and emerging sector opportunity. Including opportunity for transitional pathways.

### Enhance Essex Supply Chain and employment and skills delivery:

- **Champion the creation of a county recruitment provider** – as a not-for-profit, social enterprise supporting businesses in Essex to source locally skilled people. The example of the approach operated by EDF/CGN at Hinkley Point could be developed and expanded to support a number of projects in Essex and potentially form the basis of a regional offer. The advantage of collaborative, rather than competitive, resourcing should be highlighted as a 'win-win' for supply chains. Sustainability could be supported through placement fees supporting management and administration cost with any surplus invested in talent pipeline for training brokerage, capability.
- **Build skills brokerage function** – support candidates' development and progression through signposting and arrangement of interventions with established training providers and associations (linked to ECTA).
- **Supply chain School** – support collaborative skills transfer and enterprise throughout the Essex supply chain to meet the demands of an evolving skills landscape.
- **Mandate use schemes through social value commitments** – performance should be measured and include both job placements and transfers across projects and local enterprise accessing markets thus recognising the value of sustaining employment as well as creating new opportunity.

## 6.5 Impact of Covid-19

The Covid-19 crisis is already impacting the construction sector, with significant lay-offs and increased unemployment. It has also highlighted the reliance of the sector on a large number of self-employed workers. In the immediate term, site shutdowns will lead to a large contraction in output. Estimates vary but a range of 50% to 70% drop in construction output in Q2 is highly likely; the current shock is several orders of magnitude bigger than anything seen in modern times.

Two clear risks are therefore evident with regards to unemployment. The first is how long the government furlough scheme lasts. One problem with the scheme is that the longer it lasts, the higher government spending will be and the greater possibility of a large retrenchment on the other side, which could hurt some construction projects. The second main risk is that shown from the previous recession. Were the pandemic to trigger widespread bankruptcies and a wider economic malaise or even another financial crisis, then unemployment will also rise substantially before only decreasing slowly.

Construction, as with all sectors, may face some problems in getting people back to work even following the lifting of restrictions. Re-deploying sites before a vaccine becomes available will require the continuation of distancing measures that will impact productivity; may mean fewer trades or people on site at the same time and without extending operating hours, daily output will drop. This issue could result in further programme delays and will continue to cause problems until the end of all social distancing measures.

Additionally, there is issue relating to the structure of the labour market, compared to a national average of 15%, 40% of workers in construction are self-employed. The Construction Industry Scheme (CIS) and IR35 in relation to employment status has been an ongoing concern for Government and makes the support for self-employed workers particularly complex and necessary for those involved in the industry. The self-employment scheme is dependent on previous announced trading profit and is clearly less straightforward than letting an employer deal with the government while they continue to pay the worker.

Supply of materials has the potential be another risk factor. The greater the number of component parts and the more complex the manufacturing process, the more likely there is to be a delay in getting hold of the end construction product. In 2019, the UK imported almost £18bn of construction materials. These products will face not only disruptions in manufacture but also issues associated with logistics in supply. This extra factor affecting imports may mean that domestically sourced materials become more attractive.

While manufactured materials may face bottlenecks and uncertainty around prices, raw commodities have noticeably fallen over the past month. As global demand has fallen, so have prices – the price of crude oil has collapsed, and this will help limit inflationary pressures where there are shortages of materials.

The priority issue will be the speed of recovery and if the workforce and materials supply remobilisation can be accelerated. With the length of programme delay varying, both from the immediate shutdowns and then potential difficulties in obtaining materials, a typical structure construction programme will face challenges; also delay in one programme may trigger problems on other projects and it will likely time before the industry returns to some level of equilibrium.

A factor exacerbating this issue is construction supply-chain businesses failing from the pressures caused by sites closures. Similarly, if closures are extended the risk that Tier One contractors collapse will increase. In January 2018, when Carillion collapsed, new work output had one of its worst months



on record. Small businesses going bust will complicate programmes further while a large one collapsing could create havoc amongst a supply chain desperate for cash and lacking resilience.

These issues, as well as those around labour and materials, show that it will take time before construction output reaches the same level as it was before the coronavirus struck. In addition to existing projects facing problems, future schemes will also come under scrutiny. Existing projects that are on site are unlikely to be stopped, but new ones might be mothballed. From a sectoral perspective, infrastructure projects are likely to enjoy more security over the short to medium term.

Construction, with its narrow profit margins and fragmented supply chain is likely to find many firms encountering such difficulties. It is also a sector that always does badly in a recession as large investments are delayed and cancelled, and this time is unlikely to be any different.

Until a vaccine is available, there may be a reluctance to spend. However, even once there is a vaccine, firms and households will find less income available and a weaker commercial and housing market is likely to outweigh the good news from earlier in the year on HS2. Similarly, the government may need to revisit their commitments from the Budget. Further stimulus for some sectors is possible but having spent so much protecting livelihoods during the pandemic there is also a strong chance of a new era of austerity.

Construction companies are making plans for a return to work, but one which is likely to be staged and will be driven in the short to medium term by the ability to put in place social distancing measures both in the workplace and to access the workplace.

In the interim, as across all sectors the relevance of digital technologies and communications has demonstrated the opportunities of working remotely. It is also anticipated that applications of technology will support the return to work in the short term and accelerate adoption. For example, manufacturing can potentially provide a more controlled environment to manage social distancing and therefore accelerate the ramp-up of construction activity and mitigate risk against any later peaks.

Finally, it is necessary to consider the impact on the private training provider landscape. There are significant concerns that some training providers will not be able to survive the impacts of social isolation and provision will be reduced in the short-term. Whilst, those resilient to these impacts will, inevitably be enthusiastic to build business, the sector may become risk averse and require support to re-establish capability and capacity.

Whilst, the short-term situation has been altered dramatically; it is no longer a tight labour market and there is predicted slowdown in construction growth, we feel that the long-term recovery will be driven by improved productivity and the recommendations defined in this report will support the development of the sector economic and employment and skills landscape maximise opportunity.

By taking a strategic and proactive approach to driving a collaborative response, Essex County Council can provide a catalyst for sustained recovery and influence how the structures and mechanisms to support are delivered. It will be necessary to establish an authoritative, position of knowledge, establishing data and insight relating to Covid-19 impact on business resilience, failure (including sector employers and training providers) and unemployment to define interventions supporting recovery. This will need to consider factors identified in this report, including the structure of the sector in Essex, the prevalence of small and micro enterprise, contract and agency labour and self-employment with an aim to support individuals into sustainable employment.

Identifying a key stakeholder network, including national employers, other key regions (such as London Legacy Development Corporation), skills bodies and the local sector will secure aligned and mutually

beneficial action. This can also form the foundation for delivery of recommendations defined in this report. It will be necessary to understand from Tier Ones and the supply chain, the extent of the impact on current schedules and future projects; how quickly construction will seek re-mobilise to pre-Covid-19 levels of activity. Mitigation will emerge to recover time-lost to the pandemic; this will have short, medium- and long-term focus.

Short-term actions will seek to establish how the sector, as it is currently structured, will be able to accommodate changes in the workplace as social distancing measures are deployed; medium-term measures will establish 'new-normal' ways of working and a longer-term approach is likely to focus on innovation and productivity. Also, it is worth noting that the nature of the built environment may be impacted, realising opportunity to repurpose existing property due to redundancy.

Whilst none of the challenges identified in this report are, in themselves, unique to Essex, a collaborative and aligned response, tailored to the collective impacts will support the realisation of future opportunity and benefit.